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Handling Parts in Skids on Trucks

Boxes Designed for Multiple Lifting—Electric Lift Trucks Carry Full Loads on Established Routes

BY FRED L. PRENTISS*

TRANSPORTATION problems in a small plant are often complex and more difficult of solution than in a large factory, where, with mass production of similar parts, long hauls and straight-line routing, the use of electric trucks is often regarded as an almost indispensable method of economically handling materials in process. While readily admitting their advantage for transportation in large-production plants, the manager of a small plant may assert that electrical trucking of material would not be practical or economical in his plant.

While the Elwell-Parker Electric Co., Cleveland, has used trucks for many years in its own plant, it has recently evolved a system which has improved its transportation methods and solved its handling problems. These are of a character similar to those in many plants of like size, and which include handling of material in process and, from the finished stockroom, numerous parts in comparatively small quantities. This is a plant with approximately 100,000 sq. ft. of floor space, manufacturing being done for the most part in one main four-story building. Not only does the plant as arranged require considerable cross hauling, but the work has to be carried to different floors.

The company's activities are confined to making electric industrial trucks of some 40 types. Large, standardized parts are handled on large load skids, small standardized parts in small skid boxes, and nuts, bolts and similar small pieces in nesting pans, so that the number of pieces may vary from 20 to 500.

Transporting parts economically in relatively small quantities with a standard truck is done by this company by the use of small skid boxes and tote pans, so designed

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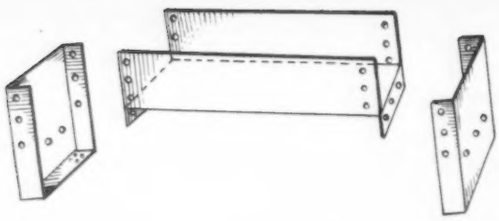
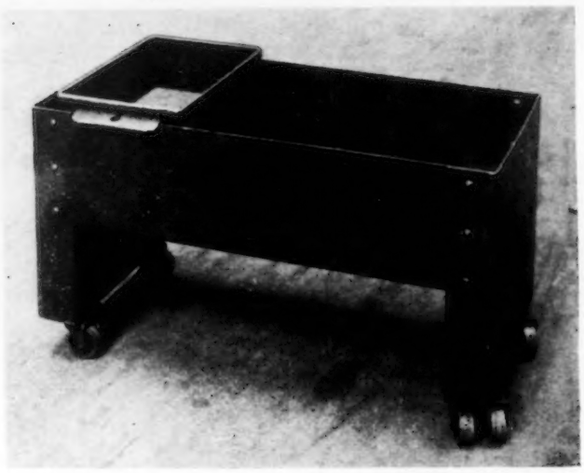
A Crane Truck Loads Truck Frames on to Another Electric Truck for Transportation from the Fabricating Department to the Assembly Department. In the case of large pieces, such as this, skids of course are not needed. The crane truck can make deliveries, but is most serviceable in its own character





SKID Used for Transporting Small Parts and One of the Tote Pans for Parts Smaller Than Those Handled in the Skids (Right). Above are the three pieces of sheet steel of which the skid frame is made

that the truck can carry a load of near its capacity, made up of a number of different parts. Three of these skids are usually transported at one time. This method is used in conveying all work except some standard parts, usually moved in large enough quantities to make large single skid loads. In addition, a routing system is provided for a truck in the production department, and a card system for controlling the truck and material movements.

Manner of Obtaining Full Loads

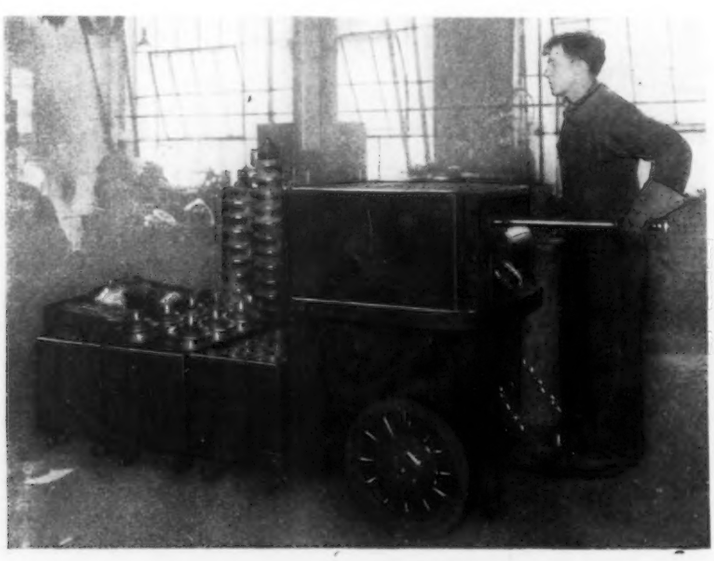
By the use of small skid boxes and handling three skids on an electric lift platform truck at one time, each skid carrying a different kind of parts, a good sized load can be moved. Tote pans, set in the skid boxes, are used for smaller parts than are carried loose in the skid boxes. With the skids and pans, a full load of various parts can be moved at one time. The saving would not be so marked in handling small loads on the electric truck, except for the element of speed. With the use of skids for handling different parts at the same time, there is a gain in speed, the electric trucks moving three times as fast as the hand trucks, and also a gain in tonnage, this being in a ratio of approximately nine to one.

Skids, designed by the company, are 36 in. long, 18 in. wide and 9 in. deep, their capacity being 3⅜ cu. ft., or 1200 lb. each. They have 11½-in. clearance from the floor to the bottom of the box, permitting a lift platform truck to be run beneath. They are made of steel plates; instead of having four legs, the ends are of solid box construction. At each corner is mounted a double-wheel caster, making the trucks convenient to be moved by hand around the machines, as well as to move to the unloading stations.

The truck serving in the production department, on which these skid boxes are handled, is of 4000 lb. capacity with a 26½ x 54-in. platform. This truck picks up one, two or three skids and can set down any one of the skid boxes making up the load. If it is carrying three boxes, it sets the three on the floor, withdraws the platform and shoves out of line the box to be left. Then the truck platform is driven under the remaining boxes, to deliver them to another point.

Tote pans are 18 in. long, 11 in. wide and 5 in. deep, and hold 60 lb. They have handles at each end and are usually set on the skids with handles resting on the edge of the skid, as shown in one illustration. The loads in the skid boxes as a rule are not flush with the skid tops, so that there is room for the tote pans to rest on the skids without disturbing the material in the skids. Each skid has a hook-hole in each end and the tote pans a hook-hole in each handle, for convenience in dragging on the floor by a hook-rod, from machine tool to the department loading point. The plant uses 185 of the skids and 500 tote pans. In addition, there are 19 large skids, 60 in. long and 36 in. wide, which are used for handling parts too large to be carried in the box skids.

Four electric trucks are in service in the plant. In addition to the one for handling the skids, a second truck is provided in the production department for carrying



METHOD of Loading the Truck. Three skids and several tote pans can be carried at one time, making a full truckload of numerous small parts. Material for a certain number of assemblies or subassemblies may thus be handled all together, facilitating the work of putting parts together

frames from the fabricating department to the assembly department, a 5000-lb. non-lifting truck for handling raw stock and a 10-ton tow tractor for moving the completed trucks before batteries are installed in them for test or shipment.

Incoming material is unloaded by means of an overhead hoist from motor trucks on to a lift truck skid, or on to the stationary platform truck, to which a trailer is attached when bar stock is being handled. This truck takes the stock to the rough stock inspection department, and then to the rough stores department if it is not needed immediately for production. This truck also takes, directly to the finished materials inspection department, parts like electric meters, bearings, horns and tires, which are completely finished when received.

Trucks Follow a Prescribed Route

A regular route is laid out for the lift truck in the production department and the operator covers this route at least once an hour. Usually the round trip does not take over 30 min., and, unless his time is taken up in special trips, the operator starts on his next regular trip before the hour is up. The routing of this truck, starting with the raw materials inspection department, is successively through the lathe and screw machine department, automatic machine and punch press department, milling machine department, drill press department, inspection department, finished stockroom, motor and controller department, assembly departments and then back to the receiving department. Two elevators are used for carrying the truck from floor to floor.

In each department are conveniently located stations for incoming and outgoing stock. From the incoming stations stock is pushed a short distance on the caster-mounted skids to the machines on which operations are to be done, and when finished, the skid is pushed back to the outgoing station. However, as the truck operator usually knows to what machine the parts are going, he frequently takes a loaded skid directly to the machine, instead of leaving it at the station. The truck carries finished parts, either on skids or in tote pans, from the finished stockroom to the truck assembly or motor assembly departments, and delivers spare parts and pans to the shipping department.

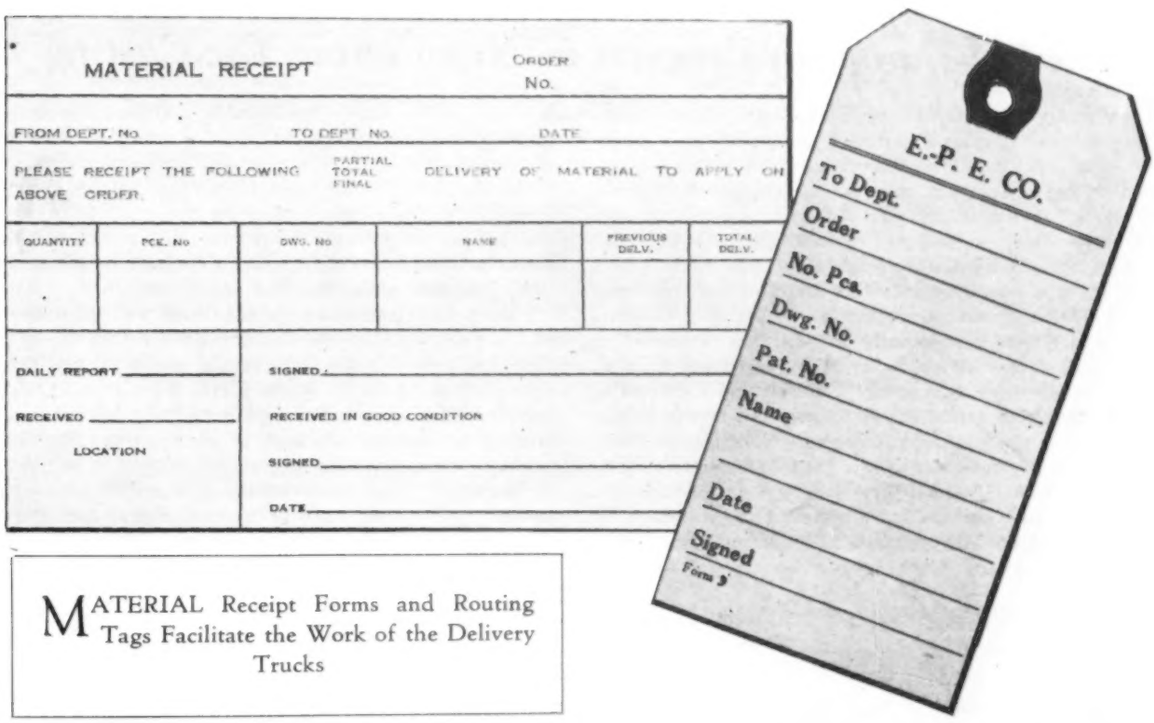
Forms Used in Controlling Material Dispatch

The truck operator gets his instructions for moving of parts by means of tags in two colors, placed on the work. Parts bearing manila tags go from one department to another; those bearing a similar orange tag go to the finished stockroom, where the tag is signed by the inspector, with the date of inspection. This card stays with the work. On these tags are spaces for listing the order number, number of pieces, drawing number, name of part and date.

Another form used is a material receipt, which is made out in duplicate for each movement of material. This receipt follows the work and shows the order number, the department from which the parts are sent, the department in which they are received, the number of pieces, the drawing number, name of part, number previously delivered, the total number delivered and whether a partial or final delivery is being made. This material receipt is signed by the foreman of the department from which the parts come and by the foreman of the department receiving them. One copy goes to the office and the other to the head of the department receiving the parts.

When parts are to be issued from the finished storerooms a material list or requisition is issued by the order department, usually covering a number of items. The head of the finished stockroom copies each item on a separate form, designating the pieces, the number and the drawing number. The pieces called for are put in tote boxes and the truck delivers them to the assembly floor. The assembly department counts the pieces as a check against the storeroom. After the requisition is filled, the stockkeeper enters on the material list the number of pieces of each item delivered, and sends the list to the assembly department, which O. K.'s it and returns it to the stockroom.

In case of shortage of some parts in the stockroom, this is indicated on the requisition by the difference between the number of parts called for and the number delivered. The stockkeeper issues to a stock chaser a shortage


MATERIAL RECEIPT

ORDER No.

FROM DEPT. No. TO DEPT. No. DATE

PLEASE RECEIPT THE FOLLOWING PARTIAL TOTAL FINAL DELIVERY OF MATERIAL TO APPLY ON ABOVE ORDER

QUANTITY	PCE. No	DWG. No	NAME	PREVIOUS DELV.	TOTAL DELV.

DAILY REPORT

RECEIVED

LOCATION

SIGNED

RECEIVED IN GOOD CONDITION

SIGNED

DATE

E.-P. E. CO.

To Dept.

Order

No. Pcs.

Dwg. No.

Pat. No.

Name

Date

Signed

Form 3

MATERIAL Receipt Forms and Routing Tags Facilitate the Work of the Delivery Trucks

list, showing what is required to complete the order. Then the stockkeeper sends a copy of the material list, showing the shortage, to the stock ledger department, where a perpetual inventory is kept. The stockkeeper retains the original material list with its record of shortages. Parts to supply these shortages come from the different departments through the inspector, being accompanied with a partial "turnout" signed by the foreman. As parts to fill the shortages are received they are trucked to the assembly department.

Much Better Time Is Achieved

This system has resulted in speeding up shipments of spare parts. Formerly parts to fill these orders were picked up only once a day in a standard skid box, having 15 compartments on each side and carried by a lift truck. Now, these orders are taken care of at once and parts are prepared for shipment immediately on receipt. These orders often come by telegraph, as users of this type equipment usually wait until actually requiring parts for replacement before ordering. Very few users stock any spare parts.

Spare part orders, on arriving at the mail department, are sent through a tube to the order department, where the order is written out on manifold blanks. A copy of this is dispatched by aerial cableway from the second floor of the office building to the finished stockroom on the third floor of the factory. The order is filled at once and the electric truck takes it to the shipping room on its next trip. This plan practically assures shipping of all standard part orders the day they are received.

Since power trucks have been used for years in this plant, and the present system has been gradually developed, the principal saving has been in smoothing out schedules that assure an even flow of materials to match the speed of the machine tools through which they pass.

Marked European Progress in Non-Ferrous Die Casting

IN his paper on "Die Casting," before the Third International Foundrymen's Congress in London, June 11 to 14, D. H. Munday said that investigations, in which he had played an important part, into the die casting of copper-rich alloys confirmed his own personal experience obtained in practice, namely, that when a new die is put into operation, there is invariably a period of trial while small corrections are made, adjustments of gates and vent effected, before the most skillful workers are able to produce regularly and continuously satisfactory castings.

As to aluminum alloys, he is fairly convinced that if satisfactory castings cannot be produced under commercial manufacturing conditions in 12-per cent silicon alloy, they cannot be produced at all, for as a general rule they are less liable to "hot-shortness." They are easier to cast, have good tensile strength, generally greater elongation and impact values, and are more resistant to corrosion.

It would appear that gravity die castings are preferable when the mechanical properties of the finished castings are the chief consideration, and that pressure die castings are to be preferred when accuracy of dimension and elimination of machining are of first importance.

In spite of these conclusions, the marked success, achieved by the author's work in the production of die castings in air-pressure machines, makes one feel that there is little to be desired as to soundness of castings when prepared under the best conditions.

Much industrial research has been done to overcome all the difficulties by the Doehler Die Casting Co. in the United States, by some firms on the continent, and by the author's colleagues in Fry's Metal Foundries, Ltd., of London. The last-named company recently acquired a new process in the manufacture of die castings in yellow metals, which promises to revolutionize this section of the industry. The improvements and modifications have passed far beyond the experimental stage, and the results in actual manufacturing conditions are quite satisfactory.

How Size of Section Affects Strength of Gray Cast Iron

TO suggest a method which enables comparisons to be made between different irons melted under the same conditions, and the same irons melted under different conditions, is the aim of J. G. Pearce, British Cast Iron Research Association, in his paper, "Influence of Size of Section on the Strength of Gray Cast Iron," delivered before the Third International Foundrymen's Congress in London, June 11 to 14. The transverse test, of course, is only one mechanical test and may offer little guidance as to the ability of the metal to withstand fatigue, fluid pressure, abrasive wear, corrosion or heat. If a series of bars from a cast be tested in tension on the same-sized test piece, the values will not, under ordinary conditions, depart far from the mean, and the same applies to transverse tests. For the particular mixture and the sizes of test bars chosen there will, therefore, be a definite ratio of transverse to tensile strength. For ordinary irons and the usual standard bars this ratio is about 1.8 to 2.

Through the courtesy of Vickers-Armstrongs, Ltd., Barrow-in-Furness, England, the author tested bars of 1.2 in. and 2.2 in. cylinder iron in transverse, averaging three results in each case. The broken bars were then turned to tensile pieces of different diameters, varying in 1.2 in bars from 1 in. and on 2.2 in. bars from 1.9 to 0.2 in. It was found that tensile strength falls off very rapidly as the machined diameter increases, but that at the specified British Engineering Standard Association diameter for each size of bar the tensile strength falls within the range represented by transverse strength divided by 1.8 to 2.0. The ratio of transverse to tensile depends on the size of the test piece, and tests on other compositions will enable the influence of composition to be determined.

In a set of bars of four compositions provided by Metropolitan Vickers, Ltd., a 1.2-in. transverse bar was broken and one half turned to the standard tensile diameter of 0.564 in. and the other to the standard tensile diameter of 0.798 in. The transverse/tensile ratio varied between 1.59 and 2.18. Further examination is needed.

The strength of cast iron is determined by its composition and its structure, these factors being fixed in part by constitution of the charge and in part by the melting conditions.

Knowing Men Is Keystone of Management

"A Machine Will Do a Known Quantity of Work in a Known Time—a Man Will Do Such Work as He Is Willing and Capable of Doing"

BY ALFRED KAUFFMANN*

"ADVANCING waves of other people's progress sweep over the unchanging man and wash him out."

That statement, made by C. F. Kettering of the General Motors Corporation several years ago, is as true today as it was 35 years ago when as a boy I entered the shops of the General Electric Co. at Schenectady, N. Y.

But before we dwell on the present day situation, let's project ourselves back to the work day of 1894 and thereabouts, when we passed through the check-in gate at seven in the morning and out again at six in the evening, with one-half hour for lunch.

Those were the days when the workman bought his own wooden wash pail, soap and towel, which he kept under his bench, and hauled out a few minutes before quitting time providing the foreman or "super" wasn't looking. If luck was with you, you got home by seven; if you missed your car, no telling when you reached home. There were compensations, however; if you were tired and needed a little nap, all you did was to set your planer, shaper or lathe to cut the air, and your buddy tipped you off when the boss's feet were heard. No piece work, bonus or premium. Some contract work in rare cases, but mostly a flat day rate, and not so very much at that. Quantity and high quality of employee production, at lowest possible unit cost, meant nothing to the average employee then. He knew little of the customer's side of the picture—seldom shared in any of the gains, consequently was interested only in putting in a day's work.

*Abstract of an address before the National Association of Foremen at Indianapolis, June 8.

The Buying Public Is the Boss

And in those early years we had every so often our nice little strikes because one or the other of us didn't want to do this or that, and as we all sympathized with each other we quit, sulked, lost our pay, and finally came back, all because the fellow that hired us thought he was boss and we thought we were boss—when all the time neither of us was boss—but we hadn't learned yet that "the buying public is the boss of us all."

No matter what position we hold, workman, foreman, superintendent, manager, president, or what not, let us fail to give or to make good products, then see how quickly we'll be called to account for our work by the buying public.

Of course, the waves of progress taught us that millions were wasted in unnecessary strikes—we also learned that many losses were due to neglect on the part of the manufacturers to give the same consideration and attention to the human element of their factory as they gave to their machinery. The employees learned also that the employer was their agent who found purchasers for the product of their labor. So between the two we learned that many years of labor were needed for a worker to recover his wasted savings, or for the manufacturer to replenish his loss.

Treat 'em rough, and tell 'em nothing, was not very

A. O. KAUFFMANN

PRESIDENT of the Link-Belt Co., Chicago, Alfred O. Kauffmann has been associated with that organization since 1901. Born in Esslingen, Germany, Aug. 20, 1879, he came to this country at the age of three. After attending the public schools of New York and Rutherford, N. J., Mr. Kauffmann apprenticed himself at the age of 15 to the General Electric Co., at Schenectady, N. Y. He worked in the tool room of that plant until August, 1895, when he entered the machine shop of Robert Hoe & Co., New York, manufacturers of printing presses. While with the Hoe Company he studied at Cooper Union, New York, and in 1898 cntered Pratt Institute, Brooklyn, from which he was graduated in 1901 with the degree of mechanical engineer. Immediately afterward he entered the service of the Link-Belt Co. as a draftsman in its Philadelphia branch. In 1906 he was made superintendent of construction and in 1909 he was appointed sales engineer in charge of the West Virginia territory. In January, 1913, he was made assistant to the president, at Chicago, and in July of that year was appointed manager of the Philadelphia plant in charge of operations of the company's Eastern division. In October, 1914, he was transferred to Indianapolis and in February, 1915, was chosen vice-president and general manager, the position he held until his election as president a few years ago.

far from the true relationship between management and employees in manufacturing plants in the early days.

Today, just the opposite views are held by executives whose function is the handling of employees. Men today want to know what it's all about. They are intelligent enough to comprehend the facts, and to use them constructively, and it's good business to give them the information.

Keeping Down Customer Turnover

Old customers are the backbone of any business. If we keep them satisfied with price and quality and delivery we will have less customer turnover. When these facts are brought home to employees, it will stimulate them to appreciate that their performance has a direct bearing upon the marketability of the product. Losses and wastes invariably are reduced by the arousal of interest. So I say again, consider the factory employees as part of the sales force, and tell them everything.

Modern business is organized in such large units today that in an ever-increasing number of cases men who 25 or 30 years ago would have been in business for themselves are today important factors in large corporations. Men with high qualifications devote their talents to marketing, production, accounting or some other phase of the company's business, but irrespective of its many ramifications, the fundamental principles underlying business success are few in number and simple in character.

To start with, the object of being in business is to make profits, and the index of success is the ratio of the profits actually earned to the real profit-making possibilities of the business.

Having determined what these profit-making possibilities are, the next step is to ascertain what the causes are that contribute to failure to realize these potential profits.

We must find out to what extent this failure is due to manufacturing inefficiencies—to excessive sales costs—to short-sighted or incorrect company policies—to defective accounting methods—to ineffective or inadequate advertising, or to still other conditions.

Mergers No Substitute for Good Management

Bear this in mind—mergers of small companies into one large company provide no substitute for competent management. After they are set up and operating as a unit, their earnings, as in any other form of business, depend entirely on the sound judgment and foresight of the management.

But with big business and mergers an entirely new condition was created. Industry, instead of belonging to the privileged few, is passing into the hands of the many. Today there is an army of employee-owners in every large organization. Does not this put an added responsibility on the management? The passing of a dividend becomes a serious matter, if the action hits the pocketbooks of the workmen, foreman, superintendent and company officers. Also workers who are now part owners of their companies are beginning to have a better understanding of the duties and difficulties of management.

Now what part do we play in this picture? Most of us in this room are interested in the manufacturing end. What proportion of the failure to get the best out of our plants can be pinned on us? We all know that an industrial plant is only a mass of junk unless some one is around to see that the bricks, mortar and machinery become tools of production. And that takes human beings.

There may be all kinds of trends in industry—mergers, consolidations and what are sometimes called vertical trusts; or history may bring about the cutting up of the big units into small ones again, but what will always be needed will be men to do things. Men are not such certain quantities as money, materials and machinery. A machine will do a known quantity of work in a known time. A man will do such work as he is willing and capable of doing.

Men, then, are the most important factors in the conduct of any business. And what difference does it make whether we mention this before a gathering of foremen, salesmen or executives, when the cry is always the same. Forget the title tacked on to our names, and look at it from the big opportunity standpoint. Men grow by having responsibility laid upon them. You may be a foreman today and a superintendent or manager tomorrow. The same applies to the workman under you. In a sense you are his manager. Encourage him, let him know that he has a chance to get ahead, and that his chance lies in himself, and you will get further than through any scheme of profit sharing, bonus, or welfare work, though they all may be very helpful.

Employees Need Encouragement

The chance to say "Yes" to the question, "Am I getting on?" is what appeals to most men.

You men here who are foremen—

You know better than I do the many petty things that come up during the day or week, the burden of which must be borne by you. You know the most important factor is maintaining high quality and low cost. Why tell you anything about the direct loss due to spoiled work, or that rush jobs are always more expensive than regular jobs?

Some of you may, but all of you should, have practical knowledge of manufacturing economies and accounting—have a clear insight into such overhead items as equipment depreciation—tool cost—scrap charges—supply costs—supervision and inspection charges and the like—in their relation to direct charges and total costs.

But more important than all is a working knowledge of *human beings.*

Unreduced Oxides in Pig Iron

A STUDY of the origin of non-metallic matter in pig iron and its behavior in steel-making processes, being conducted at the Pittsburgh experiment station of the United States Bureau of Mines, in cooperation with the open-hearth committee of the American Institute of Mining and Metallurgical Engineers and the Bourne-Fuller Co., Cleveland, has shown that it is always present in any grade of pig iron, but that it is present in fairly small amounts unless the blast furnace is working irregularly. The average percentage in 61 samples of basic pig iron was 0.0272, in 50 samples of Bessemer iron, 0.0223, and in 15 samples of foundry iron, 0.0078. The oxide content of the metal is increased during transfer from one vessel to another, such as from the blast furnace to the mixer or from the mixer to the open-hearth, due to oxidation of the metalloids in the iron. When the blast furnace is operating irregularly the proportion of non-metallic matter may go as high as 0.15 to 0.20 per cent.

These non-metallics are composed of silica, and iron and manganese silicates, and analyze approximately 50 per cent silica, 30 per cent iron oxide, 15 per cent manganese oxide and 5 per cent alumina. When pig iron is converted into steel some of these unreduced oxides remain in the steel and it has been shown that high temperatures, high residual manganese and fluid slags are favorable for their elimination. In certain cases, the quality of the steel could be related directly to the amount of unreduced oxides in the iron used in making the steel.

Fine Springs Need Close Tolerances

Small Errors in Size and Shape Result in Large Variation in Load-Carrying Ability—Heat Treatment Affects Elasticity and Fatigue

BY R. W. COOK*

THIS paper will endeavor to indicate some of the things which a spring maker can and cannot do, and how variations in sizes (which may seem quite negligible to the uninitiated) have a large influence on the work which the spring will be able to perform.

For some reason spring manufacture has commonly been looked upon as an art rather than an applied science, and there has always been an atmosphere of mystery surrounding the so-called "art of tempering." Many people are under the impression that the spring maker, through some uncanny power, can make a spring stronger or weaker by some change in the heat treatment. To dispel these errors it will be demonstrated, first, that a spring to support predetermined loads is the result of good engineering design and not of heat treatment; and, second, that a spring made of annealed wire would support as much load as one of the same shape and size that was heat treated or cold drawn provided the elastic limit of the soft material is not exceeded.

Metal in the form of springs has the same physical characteristics as though it were used for other engineering parts. For instance, it obeys Hook's law, which states that stress is proportionate to strain up to the elastic limit of the material. In other words, if a spring deflects 1 in. when supporting 100 lb., it will take 200 lb. to deflect it 2 in.

The physical properties used for designing or laying out springs are the same as the engineer would use in designing a bridge, a gear or an automobile axle—the major difference being that, instead of designing the spring as he would a bridge to sustain certain loads with as little deflection as possible, he plans them to deflect a definite distance under a definite load, to return to exactly the same position when the load is removed, and to repeat this exacting operation indefinitely.

Some materials are fine for springs and some are no good at all. For instance, cast iron is useless for spring purposes; a piece of stick sulphur would take no deflection whatsoever before breaking; a piece of rubber, which might be capable of being stretched a great distance and return to its original length, would make a poor spring because it moves too far for a small load. In spring steels we not only have a high elastic limit, but we have a high resistance to stress (or "stiffness"). These two are the important characteristics; the total usefulness of a piece of metal, as far as the manufacture of springs is concerned, is expressed by a combination of its stiffness and its elastic limit.

Stiffness Measured by Young's Modulus

This matter of stiffness is expressed in standard terms, so that one material can be compared with another, by means of Young's modulus of elasticity. Young first discovered that the stiffness of a material and the amount that it could be deflected were two entirely separate factors. Young's modulus is found experimentally by dividing the load on a test piece by the amount it stretches. It is expressed, therefore, in pounds per square inch. If we are talking of Young's modulus in tension, we mean the number of pounds which it would require to stretch a 1-in. block of the material until it measured 2 in., assuming that this could be done without passing the elastic limit.

The peculiar part of this physical property is that Young's modulus for all steels is approximately the same number. The slight variations noted in the experimental determinations are not brought about by heat treatment but by other factors, such as

SPRINGS of a Wide Variety of Shapes and for Many Diverse Purposes. Each presents a design problem different from the others

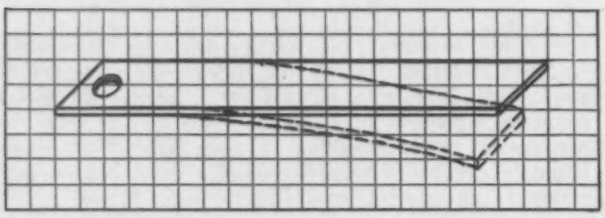
*Vice-president and factory manager, Wallace Barnes Co., Bristol, Conn.

chemical analysis and size of test piece. For all ordinary spring calculations we can treat the modulus as a constant; for steel in tension use 30,000,000 lb. per sq. in., and 12,000,000 lb. per sq. in. for steel in torsion. Of course, if bronze or some other metal is to be used, we then have to substitute the modulus for that metal in the formula.

We therefore find that formulas for unit loads on springs contain constant factors or physical dimensions. Consequently *design* alone, and not heat treatment, controls the unit load.

Deflection Controlled by Elastic Limit

The other physical property of metals used in spring engineering is the elastic limit, which controls the distance that a spring can be deflected without permanent set.



Flat Spring Deflected at One End. 0.0005 in. variation in thickness of 0.010-in. strip makes error of 16 per cent in load-deflection test

Elastic limit is directly dependent on the quality of the material and its heat treatment, it enters into the formula for total capacity of a spring, but is the limiting factor only when springs are to be used at maximum capacity. Needless to say, this condition should be avoided when possible, but is encountered in some important spring work, such as clock springs.

Either the elastic limit or the ultimate strength of the metal is also connected with the endurance of springs on repeated loadings. Not nearly enough is yet known about this important subject. Since heat treatment can affect the elastic limit and the ultimate strength, it also must have some indirect relationship to the endurance. Some authorities who have studied metal in straight test pieces claim that the endurance limit (that is, the load which can repeatedly be placed on the metal without ultimately breaking it) is raised as the tensile strength goes up, either by alloying or heat treating. This appears contrary to the old, old rule of thumb in the spring industry: "for fatigue conditions use the lowest temper* that will do the work without taking set."

Test Results Affect Manufacturing Conditions

Another method of testing used in the laboratory of Wallace Barnes Co. is to deflect springs under definite operating conditions until they break, and continue to vary the manufacturing conditions one at a time until the combination is found which gives best results. One definite finding may be noted: overheating, especially of steels containing more than 0.90 per cent carbon, is a prolific cause of erratic performance. We have also been able to prove that the rule of thumb mentioned above has a basis in fact, namely, that a low tempered spring will actually do far more work than a high tempered spring.

Therefore, a most important result of heat treatment is to be found in producing uniformly good fatigue properties, and this field of research is yet only in its infancy. Probably we will eventually find that a certain microstructure and hardness will deliver more work than any other.

To conclude this portion of the discussion, springs should be designed so that their work is well within not only the elastic limit but the predetermined endurance limit for that particular metal. All of which substantiates what has been indicated so many times in practice, that if springs have suitable hardness and still do not perform, the design should be changed rather than hardness increased. The latter results in erratic fatigue resistance.

*"Low temper" here means low carbon or low hardness, rather than low drawing temperature.

Close Tolerances Frequently Necessary

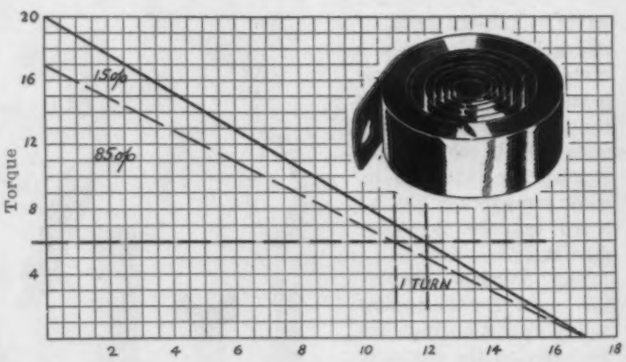
Having indicated the limitations of heat treatment as relates to the performance of springs, the matter of tolerances may now be considered briefly. By taking a few examples a great amount of light can be shed on spring design in general, and a new idea acquired of the degree of accuracy required in the manufacturing of small springs.

Take the insignificant lever spring in the distributer of an automobile engine. It gets scant attention, but it must return the circuit breaker lever to its original position with correct tension within two ounces, plus or minus. It will do this 250,000,000 times while an eight-cylinder car runs 25,000 miles. Or we might consider the control which advances or retards the spark as the throttle is opened or shut; it is actuated by a spring which will not vary in length over 0.005 in. under a given loading. Such examples could be multiplied indefinitely.

Such limitations mean the accurate control of more dimensions than are met with in most machine parts.

Causes of Variations in Wire Size

One of these is dimensional tolerance in the material itself. Without discussing this in detail it is interesting to note a few causes of variation in cold rolling a strip of steel, such as variation in size and quality of the hot rolled bars, change of temperature in the rolls, bending of the rolls during cold rolling; "give" in the roll necks and bearings; eccentric grinding of the rolls; and extreme difficulty of gaging strip while it is traveling at 100 ft. per min. Similar causes of variation might be found in wire drawing, and while these variations might amount to only 0.001 in., or even a quarter as much, they affect vitally the action of the spring, as will be demonstrated later. Then come



Clock Spring, Normally 0.020-In. Thick, if 0.001 In. Undersize Would Lose 15 Per Cent of Total Energy and 8 1/3 Per Cent of Running Time

the difficulties of fabricating the spring itself, not only in forming it to the correct shape, but the much more difficult task of heat treating it without deformation.

Thickness of Flat Wire Most Important Dimension

For the first example to show how these slight variations affect the test or performance of the spring, assume a sample flat spring, such as many illustrated in the group on the first page of this article. It is fixed at one end, like a cantilever beam. It has 6 in. effective length, it is 1 in. wide and 0.065 in. thick. It will deflect

approximately 1 in. if 10 lb. is hung on the free end, according to the formula—

$$f = \frac{4pl^3}{Ebh^3}$$

In this, f equals the deflection, p the load, l the length, E the modulus of elasticity in tension, b the width of the stock, and h the thickness. It will be noted that the deflection varies directly as the first power of load and as the cube of the length, and varies inversely as the modulus (which is a constant), the width, and the cube of the thickness.

In such a spring all these factors can be easily controlled except the thickness. It is subject to variation due to the conditions in the rolling mill previously mentioned.

Helical Spring, Where Fabrication Tolerances May Cancel Each Other

Note that the thickness has a very important effect on the load (or the deflection, as the case may be), since it enters into the formula in the third power. Suppose the spring is bought under a specification which says that the load to cause a deflection of 1 in. shall be 10 lb. plus or minus 5 per cent. That means that the thickness of a nominally 0.065-in. strip can vary only plus or minus 0.0015 in. This is less than the commercial tolerance for rolling this thickness of material.

Variations in thickness become more important as the spring gets thinner. Thus, assume a tolerance of plus or minus 0.0005 in. for a 0.010-in. strip (which would be considered excellent accuracy in rolling). That alone would cause a variation of plus or minus 16 per cent in the load required to give standard deflection.

Another good illustration is a clock or phonograph driving spring, such as shown at the bottom of the illustration on the first page. The formula is

$$f = \frac{12plr^2}{Ebh^3}$$

Here also the load varies as the cube of the thickness. If the thickness of an ordinary phonograph spring is decreased from say 0.020 in. to 0.019 in., other factors being equal, the maximum torque would drop from 20 lb. to 17 lb., a loss in maximum torque and total energy of 15 per cent. If such a spring 0.020 in. would give 12 effective turns on its arbor under the working condition, and the steel were 0.001 in. undersize, one total turn would be lost. This means 8⅓ per cent of the running time of the spring-driven motor.

Errors in Helical Springs May Mutually Counterbalance

Variations in size have even more noticeable effect on helical springs, such as valve springs, but fortunately there are several variables entering into that formula. Some of these variables will run over and some under, with the net result falling within the specified tolerance for length or compressibility. For instance, an actual specification calls for a valve spring 2 7/16 in. long, 1 7/16 in. mean diameter, with 7¾ coils of 0.162-in. wire. It is required to be 2 in. long under 30.25 lb. plus or minus 1 lb., and 1 7/16 in. long when loaded to 61.5 lb. plus or minus 1.5 lb. The formula for the unit load of such a spring is

$$\frac{P}{f} = \frac{d^4G}{64nr^3}$$

The unit load varies directly as the fourth power of the wire diameter and the modulus in torsion, and indirectly as the number of coils and the cube of the mean radius.

In order to be within the tolerance allowed in the load test, the wire diameter must be correct to 0.001 in., other dimensions being exact. Or we may take 0.010 in. tolerance on the diameter of the spring, or allow one-seventh of a coil on the number of coils, or 0.015 in. on the length. Each of these figures taken separately is too close a limit for mass production. The ordinarily accepted tolerances on such a spring would be plus or minus 0.002 in. on the wire size, plus or minus 1/32 in. on the diameter, plus or minus 3/32 in. on the length of the spring, and plus or minus one-half coil on the number of coils. Fortunately some of these errors in production will be on the high side while others fall on the low side, and thus partly counterbalance each other. Otherwise it would be a matter of great good fortune to find a spring which would fall within the specified acceptance limits.

While spring makers who take pride in their product like to work to close tolerances (and like to collect the premium which precision always warrants), the above explanation indicates that the limits should be chosen with judgment. Accuracy should be asked for where accuracy is actually needed, and latitude allowed where latitude is possible. If a designer who is used to dimensioning machine parts to plus or minus 0.002 in. should do this out of mere force of habit when ordering springs, he may inadvertently place conditions upon their manufacture which will cause exasperating delay and unwarranted expense.

Nitrogen Content of Steel Is Harmful

There has for a long time been controversy as to the effect of nitrogen in steel, many claiming that it is harmful. A Norwegian, Hjalmar Braune, discusses various problems connected with this subject in a Norwegian technical paper, according to the London *Iron and Coal Trades Review*.

When pig iron is made in charcoal blast furnaces, nitrogen is usually present in the iron in quantities of about 0.002 to 0.003 per cent, if the furnace is worked at a moderate speed and without excessive preheating of the blast. However, with hot-blast and high-speed working, the nitrogen content will be considerably higher—often 0.020 to 0.025 per cent, owing to the increased formation of cyanogen compounds in the furnace. It has long been known by manufacturers and consumers of high-grade pig iron that furnace working conditions have a great influence on the quality of the iron, even if the ordinary analyses are identical with exceedingly low contents of sulphur and phosphorus.

According to the author, it has always been almost impossible to make a first-grade steel from hot-blast iron —a fact recognized as a function of the nitrogen content, which causes an excessive brittleness in the hardened steel. Buyers of Swedish pig iron, therefore, often used to stipulate that the iron should be produced under fixed working conditions, such as cold blast (not above 150 deg. C.), moderate speed, etc.—conditions which cannot easily be controlled by the consumer. It is recommended, therefore, in such cases to adopt the determination of the nitrogen content as the standard test, since this can easily be determined, and will give clear evidence of furnace working conditions.

Automobile Hardware to Be Forged

Transition from Castings and Stampings Suggested—Methods of Production and Heat Treatment in a Versatile Plant

BY F. W. MANKER*

BETTERING the quality of materials and workmanship, a trend of craftsmanship in the times of our forefathers, also dominates the present age of mass production. Probably the outstanding example of this today is the trend in the automobile industry toward better performance, greater endurance, longer life and greater beauty in lines.

This applies to the individual parts just as forcibly as it does to the completely assembled car. Among the parts that go to make up a car the automobile hardware includes such items as crankshafts, steering knuckles, clutches, brakes and accelerating pedals, shift levers, yoke end assemblies, brake band assemblies, disk clutch plates, etc.

Organized in 1881 for the manufacture of vehicle hardware, the Cleveland Hardware Co., Cleveland, is today the largest maker of vehicle hardware in the world and the only one in the United States that produces a full line. During its early years it made hardware for buggies, sleighs, farm wagons, etc.; with the advent of the automobile this line was added. This company made the hardware for the first commercial automobile—the Winton. At present 85 per cent of its output goes into automobiles and tractors, but it is still making hardware for farm wagons. Every American car today carries some parts made in the plant of this company.

Originally the metal parts of buggies and farm wagons were castings, but this company saw the gradual transition to wrought iron and steel. This same transition is just starting in the automobile industry and, while castings and stampings are still largely in vogue, there is little doubt that the automobile hardware of tomorrow will be of completely forged parts.

At least 75 per cent of the line manufactured by the Cleveland Hardware Co. includes some part which is drop forged. While this company makes and stocks thousands of parts of different types, approximately 60 per cent of its output is special work made on contract, and according to the blueprints and specifications of its customers.

This firm operates its own rolling mill, where it rolls special shapes. Much of this steel is later put through the upsetting or forging processes. There are two plants, five miles apart, each a duplicate of the other, except that the rolling mill at No. 1 does for both.

In the rolling mill are six stands in one train, and an independent mill; all are three-high. Two sizes of billets are used, 2 x 2 in. and 4 x 4 in. These are heated in two regenerative billet furnaces which are fired with gas, a temperature of 2200 deg. Fahr. being maintained. The hearths are 7 x 12 ft. and 7 x 14 ft. Each furnace has two gas burners on each side, and the standard reversing

*Assistant to the president of the Great Lakes Steel Corporation, Detroit, but, when article was written, vice-president of the Surface Combustion Co., Toledo, Ohio.

Gas-Fired Carburizing Furnaces in a Row, Used in Making Hardware Items

Corner of Heat-Treating Department, with Two Rows of Gas-Fired Furnaces

Mechanical Handling of Parts to and from Heat-Treating Furnaces Is Provided for by the Hand-Operated Overhead Crane. Pyrometric control of these furnaces insures repetitive results

Long Line of Trimming Presses Served by Belt Conveyor Which Carries the Parts to Tumbling Barrels for Cleaning

mechanism. Natural draft is supplied through a 175-ft. chimney.

The independent mill is used to roll ruptured bar stock, which saves certain operations in forging. A row of board drop hammers, up to 2 tons in capacity, as well as bulldozers, presses, etc., are used to work the steel. Hot-trim presses are placed alongside the hammers, while the cold-trim presses are in an adjoining department.

These latter are arranged in a long line, supplied by a traveling belt conveyor. The forgings are placed on this in the hammer room and are carried along just back of the presses. The operators on the different presses pick off the parts which their particular press is equipped to trim, trim off the flash and drop the parts on to a short conveyor running at right angles to the supply conveyor.

These short conveyors dump the parts on to another long conveyor running parallel to the first conveyor, which delivers them to the tumbling barrels in another section. When full, these barrels are put on to stands and revolved.

This ganging system, of belt conveyors to bring work to and remove it from the operators and machines, is used throughout the plant wherever applicable, thus eliminating as much trucking, hauling, etc., as possible. The forge shop is equipped with an overhead traveling crane of 120-ft. span, while the other shops and machine divisions are served with overhead monorail systems and electric hoists.

The company makes its own tools, dies, jigs, etc., in a completely equipped and modern tool room. The various forged and cast parts are finished in the machine division, which is fully equipped with milling machines, drill presses, reamers, thread cutters, etc. Several types of special machines are provided for special operations.

Exceptionally modern and up-to-date equipment, arranged for the most effective and efficient operation is found in the heat-treating room. There are 18 gas-fired furnaces in this room, a row of nine on each side with quenches in between, and a traveling overhead crane to assist in handling the work. These furnaces are 7 ft. wide, 5 ft. deep and 6 ft. high and are all alike.

They are used interchangeably for all kinds of heat treating, annealing, etc. Each has automatic pyrometric control and is both overfired and underfired, with two burners located in the crown and two alongside the hearth. These are provided with Surface Combustion Co. (Toledo, Ohio) inspirators and combustion equipment, through which gas is supplied at 15 lb. pressure.

A battery of six recording pyrometers is set on the wall of the metallurgist's room, together with a switchboard to which is wired the thermocouple in each furnace. In this way an exact control is maintained over the operation of each unit.

For hardening die blocks the practice is to heat them up to from 1400 to 1600 deg. Fahr. and soak them for from 8 to 12 hr., according to size and physical requirements. They are then drawn at temperatures ranging from 800 to 900 deg., after being quenched in oil. These quenches are cooled by recirculation. This gives a hard face and tough matrix. The drawing is accomplished on cast iron plates set in brick and underfired with four burners.

Great improvement in performance of modern over obsolete equipment is shown by these furnaces, as disclosed by tests with the old combustion system and the new equipment. In heat treating forgings, when the temperature was maintained constant, and the cold work was regularly charged into a hot furnace, a saving in fuel consumption of 46 per cent has been effected, together with a 25 per cent increase in production. And there is a material reduction in furnace maintenance and scale loss.

These economies were effected through the use of inspirators, or gas-air proportioners, by which the gas-air ratio is regulated to give either a reducing or an oxidizing furnace atmosphere. The desired ratio once attained is then maintained automatically, regardless of the flow of gas.

Shipping Automobile Bodies to Utilize All the Space Available in a Box Car

INTERIOR of Freight Cars (Left) Is Arranged to Accommodate Three Tiers of Touring Car Bodies, with 20 Bodies to a Car. Sedan bodies (right), being taller, are loaded in freight cars, two high, for shipment to Detroit, from Graham - Paige Body Corporation, Evansville, Ind.

Europe's Industrial and Political Future Pivots on Coal and Iron Ore

Four Countries Hold the Key to the Reparations Problem—All Must Increase Greatly Their Production for Export—Some Economic Dislocation Ahead

BY EDWIN C. ECKEL*

THIS study of the coal and iron ore supplies of the different European countries is not primarily geologic, nor is it concerned with a very hypothetical future exhaustion of coal and ore reserves. On the contrary it is concerned with the immediate future, industrial and political, also with the bearing on that future of these coal and iron resources and their development. For I am, as will appear, an advocate of the very unpopular theory that we are *not* now living in a new age of economic miracles, but still in a cold, prosaic world where effects are produced by causes.

Today, after a speculative mania such as has never before been seen, every security market in the world is in a hopelessly unsound position. Under normal conditions the inevitable remedy for this would be a speculative collapse, which might cause great individual suffering but not necessarily any great general economic loss. But in the present case the situation is irretrievably compromised by the colossal mass of inter-governmental obligations arising from the war—obligations which must in the long run be paid for by the export of goods on a most tremendous scale. And it may be noted that whatever paper agreement may be reached on the German reparations matter the economic dislocation will be more severe than anything the industrial world has yet seen. [As Mr. Eckel wrote, the reparations conferees at Paris were still in disagreement.—EDITOR.]

There are several countries which must secure reparations in full in order to avoid bankruptcy. There are other countries whose furnaces and mills might as well shut down for the 50 or 60 years during which such payments are in progress. It is obvious that the coal and iron industries, which are after all the only real bases for German earning power, are the ones most keenly interested in the whole matter. And that gives a certain point and timeliness to the present study.

Europe's Coal Percentage Half That of Ore

Before considering actual and probable future developments in Europe itself, it will be well to note very briefly the status of the European continent as a whole, with regard to coal and iron ore reserves and output.

In dealing with unmined reserves it is never necessary to waste energy on any attempt at precision, since such factors as grades, depths and workability are subject to a wide range of individual judgment. So in the present case we will deal with the subject in very round tonnages and percentages, feeling that this will bring out all the really important points with sufficient definiteness.

With regard to coal, we may then note that, on any possible basis of comparison, Europe ranks third, and a rather bad third, to North America and Asia as a holder of unmined coal reserves. The total high-grade coal in Europe, at reasonable depths, may run to some 750 thousand million tons. This is equal to between 15 per cent and 20 per cent of the total world coal reserve, figured on the same basis. Low as compared with the two other continents named, the European reserves are still enormous as compared with those of the three remaining continents, and probably three or four times as great as those of South America, Africa and Australia combined. As against this reserve tonnage, all Europe combined will mine this year not much over 800,000,000 tons of coal and lignite of all grades.

With regard to iron ore, the European situation is even more favorable. On whatever basis we may figure, the European total reserve will fall between 30 per cent and 40 per cent of the total known iron ore reserves of the world. This is being drawn against this year at the rate of something under 100,000,000 tons. The ore mined in Europe has from 1912 on ranged between 50 per cent and 60 per cent of the world total output.

Racial and Raw Material Factors

If we dropped consideration of Europe with this brief summary of its coal and iron resources, however, we would be missing most of the story. For we have in addition to take into consideration certain other facts, physical and human. On the one hand we must consider that Europe has on the whole a climate fitted for white occupation; that its irregular and deeply indented coast line gives access to most of its coal and iron ore deposits, and that the vast bulk of these deposits look toward the Atlantic basin as an outlet. On the other hand, we must consider the facts that Europe was, if not the birthplace, at least the nursery of the white race; that it is still the home of at least 75 per cent of that race; also that more than nine-tenths of all our progress in art, science and technology, during our slow advance from barbarism, has originated in Europe. To which I might add, as a purely personal judgment, that this percentage has not decreased in recent years and is likely to increase, rather than decrease, in the next few decades. For the richer the country, the stupider it is likely to become, since invention and discovery are direct functions of hard necessity rather than of comfort and luxury.

As a final matter of interest, we might pay a little attention to the manner in which these European coal and iron resources and outputs are concentrated, for it will be seen almost immediately that they are not distributed generally and evenly over the face of the continent of Europe. They are, as a matter of fact, concentrated to a very surprising degree. For as regards iron ore, seven countries possess about 95 per cent of the total iron ore reserves of Europe, while four of these account for over 72 per cent of the total European iron ore reserve. As to actual iron ore output, the production is in almost exactly the same ratios—the same seven countries produce 94 per cent of the total European output; the same four produce 72 per cent at least.

As to coal, we have again seven countries producing over 95 per cent of the total European coal output, and possessing over 96 per cent of the total European coal reserve. And of these seven, four produce over 80 per

*Mr. Eckel is spending several months in France and Germany, in the interest of American clients.

cent of the total output and possess over 83 per cent of the entire European coal reserve.

Four Countries Control Coal and Iron Ore

To give final precision to this matter, the European countries are listed below in the order of their current iron ore and coal outputs:

	Coal Output	Iron Ore Output
Germany	1	4
Great Britain	2	5
France and Sarre	3	1
Poland	4	..
Czechoslovakia	5	..
Russia	6	6
Belgium and Luxemburg	7	3
Sweden	..	2
Spain	9	7

It will be seen that the four countries which consistently rank highest as regards coal and iron ore resources and outputs are Germany, France, Great Britain and Belgium, while those which rank relatively high in one of these two basal products, but not in both, are Poland, Czechoslovakia, Russia, Sweden, Spain.

A number of countries which figure on the European map are not mentioned in either of the lists above. Such are Italy, Portugal, Greece, Turkey, Roumania, Bulgaria, Ireland, Denmark, Norway, Latvia, Lithuania, Esthonia, Finland, Holland, Switzerland. Some of these may be fit placements for American loans; some may be interesting tourist resorts. But from our present coldly materialistic viewpoint, none of them can be considered as serious factors in the future of the world. None of them can ever have any serious output of manufactured products for export; none of them can ever supply the materials necessary to keep an army or a fleet in action. None of them, by consequence, will ever be taken seriously in any diplomatic or political dispute. For this world is not ruled by charity or kindness but by steel

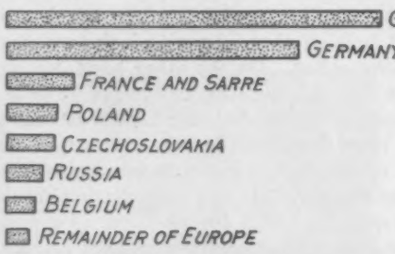


Fig. 1: Relative Coal Outputs of European Nations in 1913, Based on Their Post-War Boundaries so as to Permit Direct Comparison with Later Results, as in Fig. 2

and coal, and a nation which cannot produce either of these may be a very interesting geographical expression—but nothing more.

Concentration of Coal Industry

In merely naming the European coal producing countries without considering their geographic locations we are apt to miss one point of supreme importance—the intense geographic concentration of the European coal industry, disregarding national boundaries. In 1913, for example, all of Europe was producing some 720 million tons of coal and lignite annually. But of this total practically 600 million tons or 83 per cent was produced in northwest Europe alone, leaving only 120 million tons for the total output of central, southern and eastern Europe. And today, after 15 years of war and reconstruction, we find that the old relations are almost exactly re-established, for out of an 800 million ton output in 1928 northwest Europe produced over 665 million tons as against 135 million tons in the rest of the continent.

We have heard a good deal—chiefly in connection with new loan flotations—about the rapid development of the repaired or newly made countries of central and eastern Europe. But after all it is the old coal and manufacturing territory of Germany, France, Belgium, Holland and England which has not only regained its former status but has increased its pre-war lead in all lines of industry.

Europe as a whole increased its coal output about 11 per cent in 15 years. This is a very low rate of increase,

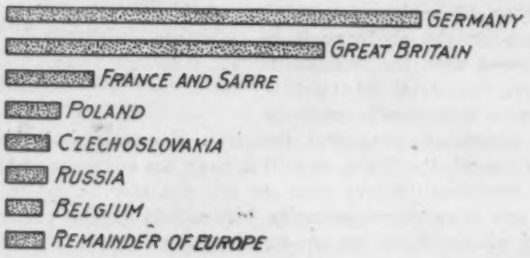


Fig. 2: Relative Coal Outputs of European Nations in 1928, Same Scale as Fig. 1. It will be seen that except for loss of leadership by Great Britain to Germany there has been no change in rank of the seven leading coal-producing countries

probably by far the lowest for any equal period in the last 150 years. But in the closely placed group of five nations above named, the group increase was somewhat over 12 per cent. And this in spite of the fact that one of its leading members, Great Britain, showed an actual loss of some 25 per cent during that period, which was more than compensated for by an increase of 35 per cent in the German output and lesser percentages in the others.

We have, therefore, not the slightest reason for assuming that the New Europe in industrial, financial or military power will be balanced nationally much differently from the old pre-war Europe. From any of these viewpoints there are after all only three real countries in Europe, and they face us on the Atlantic: England, France and Germany, with Belgium, Luxemburg and Holland forming parts of the same close geographic grouping.

France and Germany More Nearly Self-Contained

There is one very important difference, however, which separates these nations into two groups; and since this difference has serious financial and political consequences, it may be noted here. On the one hand, both France and Germany are essentially self-contained so far as necessary food and clothing supplies are concerned. Their chief imports, except for luxuries which could be cut off in time of war or other urgent necessity, are of certain raw materials destined in large part to be re-exported as manufactured goods. Under these circumstances both have always maintained high protective tariffs on manufactured goods and lower rates or free entry for raw materials. Both could, circumstances necessitating it, close their ports to both imports and exports without actually starving their populations. At present the pressure of debts makes this less and less a possibility; and an export balance is necessary for each.

Great Britain and Belgium, on the other hand, cannot support their populations on home produce. They import

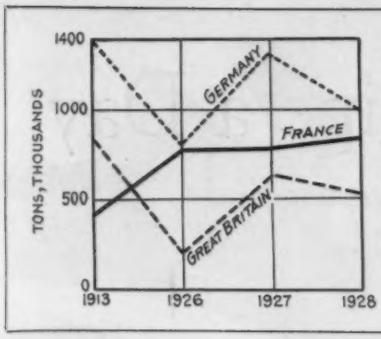


Fig. 3.—Monthly Pig Iron Output of Three Leading European Nations, 1913, 1926, 1927 and 1928. Figures at left are in thousands of metric tons. The important point is the growth of French output

not only raw materials but foodstuffs. So that since a tariff would only raise living costs without doing any good to industry, they have tended toward absolute free trade. At present, in Great Britain, the leaning is toward protection of certain key industries. It is questionable if it can be justified there except as insurance against war.

Under present conditions, of a huge mass of international reparation and debt payments, the differences between these two groups tend to disappear. All four of these countries will have to produce increased amounts of manufactured goods for export; and they will have to do this under pressure for some 60 years. And that is the chief reason for the American industrialist's interest in either debts or reparations. Every politician and every banker in every country has a patented and foolproof method of avoiding this difficulty. It will be of interest to see what happens when they meet cold facts.

Before going on to discuss the coal and iron situation of the separate nations it may clarify that discussion if we precede it by a summary of the leading facts:

Coal and Iron Situation in Summary

COUNTRY	COAL STATUS	IRON ORE STATUS	IRON AND STEEL STATUS
Germany	Coal reserves and output very large; ample for export	Iron ore reserve small; heavy imports necessary	Iron and steel capacity large; heavy exports
Great Britain	Coal reserves and output very large; ample for export. Labor costs high	Large reserve of low grade ore; heavy imports	Iron and steel capacity large; heavy exports
France	Coal reserves small; imports necessary	Enormous reserves; heavy exports	Iron and steel capacity moderate; exports not large
Belgium-Luxemburg	Coal reserves and output small; imports necessary	Iron ore reserves small; output too large; imports desirable	Iron and steel production relatively large; mostly exported
Sweden	No coal	Reserves very large; exports	Small high-grade output
Spain	Very little coal	Moderate reserves, all exported	Non-existent
Russia	Coal reserves moderate; development retarded	Moderate ore reserve	Small but growing industry for local use
Poland	Coal reserves moderate but lack of local use permits relatively heavy exports	Nothing serious	Small
Czecho-slovakia	Coal reserves moderate; fully employed locally	Moderate	Relatively intense manufacturing development
Italy	Coal reserve unimportant	Iron reserve slight	Practically zero
Austria	Coal reserve small	Iron reserve moderate	Too great for existing area of the country
Jugoslavia	Coal reserves (mostly lignite) moderate	Small	Very slight

Paris, May, 1929.

[*Concluded in* THE IRON AGE *of July* 18]

Has Made 100,000 Heats of Converter Steel

ON July 1, the 100,000th heat of steel was made in the 3-ton bottom-blown converters of the Taylor-Wharton Iron & Steel Co., High Bridge, N. J. The accompanying reproduction of a photograph shows the two converters. The one on the right has been in service since 1892 and the other since 1917.

The first blow in the older converter was made on Sept. 24, 1892, and the first manganese steel blow on Oct. 29, 1892. This was the tenth blow produced in this converter and is believed to be the first manganese steel made for regular production in this country.

During the nearly 37 years that converter steel has been made at the High Bridge plant there has been regularly produced, in addition to 12 per cent manganese steel and ordinary carbon steel, a considerable tonnage of nickel and nickel-chrome steel for castings, and a number of heats of chrome steel for armor piercing shells for the United States Government. A number of these shells in sizes up to 13 in. were used by the Navy during the Spanish-American War.

In June, 1909, the first steel for castings with manganese of 1.25 per cent was produced at High Bridge and for about seven or eight years thereafter steel of this composition was used for gold dredging buckets. The converters were used also to produce steel for gun carriage castings, powder press cylinders and ship stern frames and rudder posts during the World War.

Welding 26 Miles of Pipe a Day

Use of Automatic Equipment, Both Processing and Conveying, Converts A. O. Smith Plant into a Huge Machine

MAKING pipe-line pipe by electric butt-welding of plates, as done in the A. O. Smith plant, has created an unusual amount of interest. Perhaps still more comment has been caused by the impinging of this new-type pipe upon established lines of supply of pipe made by the conventional fire-welded method. For these reasons the story here, of how that pipe is made, should help to fill the gap in our recording of processes of steel manufacture.

ABOUT 100,000 tons of steel a month is moving by rail and water to Milwaukee, where it is being fabricated by the A. O. Smith Corporation into electrically welded pipe at the rate of 26 miles in 24 hr. The application of the electric arc is in itself an interesting development, but there are also the features of extensive use of automatic conveyors, machines for rigidly testing each length of pipe and the use of special equipment which reduces manual labor to the minimum.

Over a period of many years, this company has acquired extensive experience in the designing of automatic machinery and in the electric arc process of welding. In 1920 the company built an automatic plant for the manufacture of automobile frames [see THE IRON AGE, March 22, 1928, page 794, for description], and for several years it has been electrically welding thick steel plates into pressure vessels for use in the oil-refining industry. Today it is applying this accumulated experience to the manufacture of electrically welded pipe, the output of many miles a day of which is in diameters ranging from 8⅝ in. to 26 in.

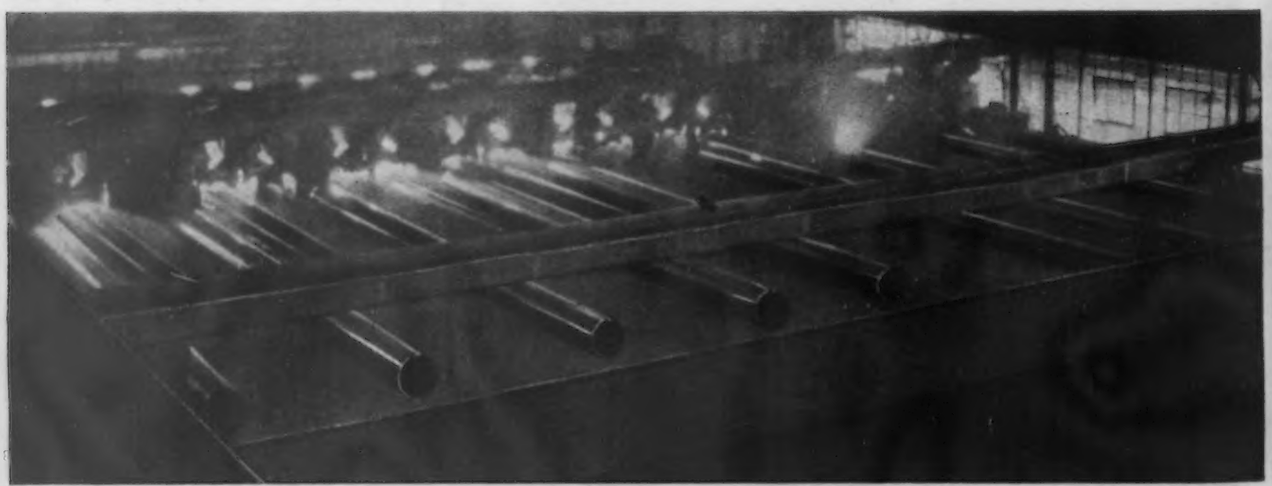
The original pipe plant was conceived, designed and built in the short period of four months and, when put in operation, had a daily production of 6 miles. This later was increased to 10 miles a day. In February of this year a second pipe mill was built, bringing the total output to 26 miles a day. Unit lengths made in the first plant are 30 ft., while the new plant was built for manufacturing units in 40-ft. lengths.

Skelp is bought on rigid specifications and is chemically and physically inspected at the mill as well as at the A. O. Smith Corporation plant before it can enter the production line. The steel most commonly used is 0.20 to 0.30 per cent carbon, having a minimum tensile strength of 60,000 lb. to the sq. in. Thicknesses range from ¼ in. to ½ in., inclusive.

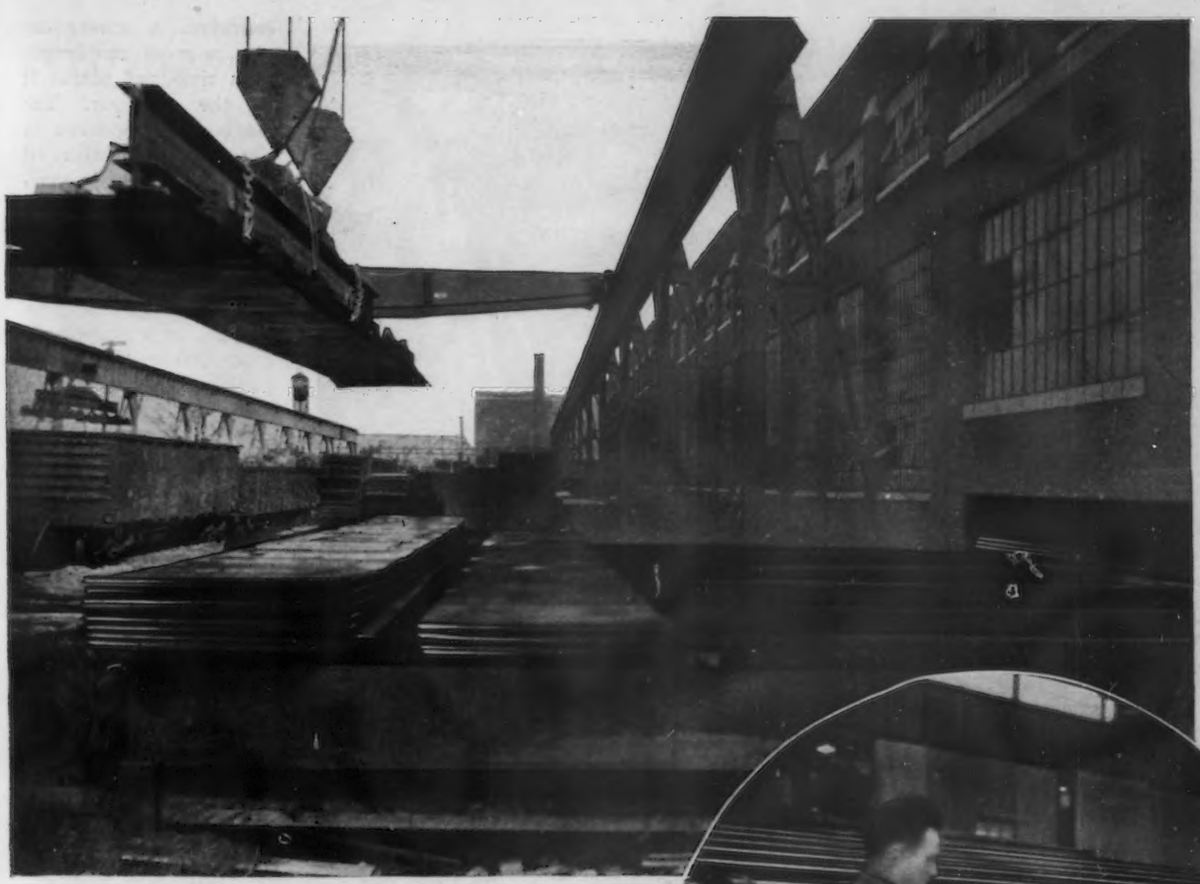
The steel storage yard, 720 ft. long, is traversed by an 80-ft. span overhead electric crane. An inclosed storage building is now under construction, where various sizes of pipe will be held in stock.

Railroad cars, loaded at the mills, are switched beneath the steel yard crane. Skelp removed by the crane may either be deposited in the storage yard or put upon a wide conveyor, which extends from the storage yard into the main building. This conveyor places the material in position for the first operation, which is that of pickling. Here the skelp is picked up in special carriers and put through a pickling and cleaning process by which all mill scale is removed. As the pipe is formed cold, scale is not produced again in the course of manufacture.

After having been prepared for fabrication, the skelp is automatically conveyed to hydraulic presses, where it is formed by a series of operations into cylinders of the required diameter. The cylinders are then moved by conveyors into the automatic electric welding machines. These conveyors run parallel and each one passes through a welding machine, which is under the supervision of an



This Battery of Welding Machines Produces 10 Miles of Pipe in 24 Hr. This is equivalent to 1760 pieces of 30-ft. pipe



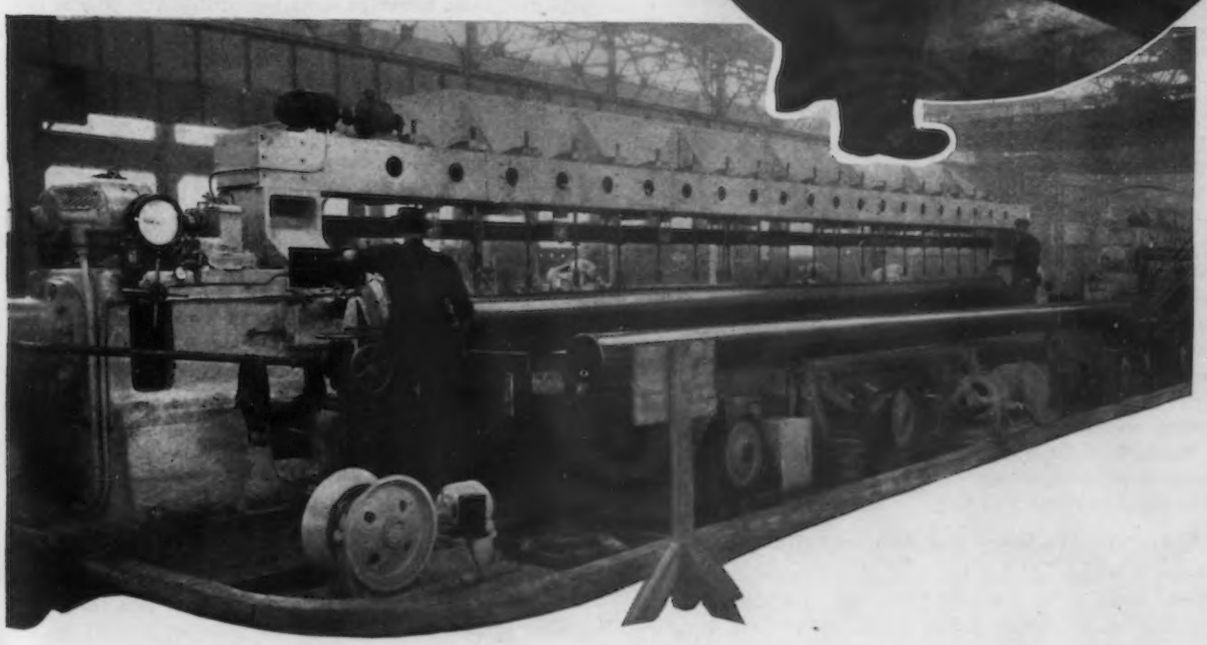
SKELP Is Unloaded by Means of a Magnet Equipped Crane. It is moved to the first operation by the conveyor shown in the foreground

* * *

An Aluminum Gage with a Steel Insert (Right) Is Used to Test for Accuracy of Roundness

* * *

Metal in Each Length of Pipe Is Stressed to 22,000 Lb. to the Sq. In. in this Automatic Hydraulic Testing Machine (Below). Before the pressure is released the weld is hammered by the weights suspended from the overhead member



An Elevated Platform Facilitates Loading Pipe into Gondola Cars. The lengths are raised to the platform by the flight conveyor appearing at left

operator. Close watch is kept on the operation of the machine and the character of the arc, to insure that quality of work which will successfully pass future tests.

Conveyors pick up the pipe at the outgoing end of the welding machines and carry it a short distance laterally to a row of milling machines. Here the welding bead is removed for a short distance at each end, to meet requirements of coupling the joints in the field. If the pipe is to be equipped for bell and spigot joint, one end is expanded cold to form the bell part, and the other end is upset cold so that a bead is thrown up on the outside of the pipe. This bead is valuable, because it assures a positive gage for the correct stabbing distance, and further it forms, with the end of the joining pipe, a well, which facilitates welding in the field.

Hammer Test Is Applied Automatically

It might be well at this point to emphasize that all operations, from pickling to and including welding, are performed in a straight line. The welded cylinders are then transported by a return conveyor to hydraulic testing machines, which stand in a row parallel with this conveyor. The pipe is automatically delivered to each machine, which tests one length at a time. The pressure used is sufficient to produce a stress in the pipe walls of 22,000 lb. to the sq. in. This pressure is held for about 10 sec., during which time the weld is continuously hammered by a series of weights, which are automatically operated and which form an integral part of each testing machine. After the hammer test the pressure is lowered about 50 per cent and the weld is inspected from end to end.

Conveyors Are Timed and Automatically Loaded

After a length of pipe has passed the hydrostatic and hammer tests it is released from the machine and is rolled out on a sloping table, which feeds to a return conveyor. A timing device releases one length at a time and places it on the conveyor. The loading arrangement is timed so that, with all testing machines in operation, one piece of pipe cannot be piled on top of another as it is passing by on the conveyor.

Tested lengths of pipe are fed to a cross conveyor, which forms essentially another link in the chain of inspections that this product must undergo. One of the principal tests made is for roundness. For this, aluminum gages with steel inserts are used; the gages are light in weight and prevent fatigue of the inspectors.

Pipe lengths which have passed all inspection are automatically delivered to a conveyor traveling practically the full length of the shop. One length at a time is placed on this conveyor, which passes through a housing equipped with numerous nozzles for spraying a washing solution over the pipe. This solution is heated and thereby the pipe is warmed so that moisture is quickly evaporated and the pipe is dry before it reaches the paint spray.

The next operation on the line is painting the pipe. The conveyor passes through a housing on the inside of which are mounted paint spray nozzles. Both washing and painting machines are operated by automatic trips, so that the sprays are in action only during the time that a length of pipe is passing through a housing. In other words, the spray is cut off automatically as the trailing end of the pipe passes from its reach. The space between wash and paint housings is so gaged that the pipe is dry, but still warm, when the paint is sprayed on the pipe.

An extension of this conveyor runs past three parallel flight conveyors, which deliver pipe to an elevated platform. Automatic trips are set so that the flight conveyors can be loaded in rotation, or as desired.

The method of loading this pipe into gondola cars is of interest. The load below the level of the car sides is tied in as one unit. Then the load above the car sides is tied in as another unit. Finally, both are tied together, resulting in a single unit that does not shift in transit.

Tests have been made on this pipe in some variety. One of the most interesting was on a 30-ft. length of 16-in. outside diameter pipe with ¼-in. wall thickness. This pipe was first put through rolls to flatten it with the weld at one edge, where the stress is greatest. This part of the test left the pipe in a hoop-like shape, with the walls pressed together like a deflated inner tube. Heads were welded on the ends and the pipe put under hydraulic pressure. As the pressure was increased the pipe straightened out to within a foot of being perfectly straight, and it came within 3/16 in. of a true circle. The pipe burst at an internal pressure of 1910 lb., producing a stress of 60,800 lb. to the square inch or five times the working pressure.

Willis L. King Finds Sharp Contrasts in His Sixty Years in Iron and Steel

WILLIS L. KING

COMING into the industry only four years after the close of the Civil War, Willis L. King, vice-president of the Jones & Laughlin Steel Corporation, Pittsburgh, has had a longer experience with the ups and downs of iron and steel manufacture in the United States than any of his contemporaries. In July, 1869, at the age of 18, he entered the employ of the firm of Jones & Laughlin, so that the present month marks the completion of 60 years of continuous connection with an interest that has long been named among the three or four leading producers of American steel. Only four years before 1869 was the first "blow" of Bessemer steel made at the famous Troy works, and 15 years passed before the production of Bessemer ingots had climbed to a million tons.

Most important of the changes that have come in Mr. King's long career—one that was fairly revolutionary in the case of his own company—was the practical abandonment of the manufacture of finished iron and the substitution of steel for all rolled products. In the case of the Jones & Laughlin company this has meant an advance from an output of 100 tons of iron a day to more than 10,000 tons of steel ingots daily. For many years Mr. King has been a prominent figure in the councils of the industry, particularly so since the death of B. F. Jones, head of the Jones & Laughlin company, in 1903, following Mr. Jones' long service as president of the American Iron and Steel Association. Since the organization of the American Iron and Steel Institute in 1908, Mr. King has been one of its directors and for most of the interval one of its vice-presidents. Within the past year he was made its honorary vice-president.

With the thought of marking the very unusual anniversary of this month, THE IRON AGE asked Mr. King for an expression concerning the contrasts between 1869 and 1929. We are gratified in presenting below his reply, which adds another to his valuable reminiscences of an eventful period in our iron and steel history:

Mr. A. I. Findley,
Editor THE IRON AGE, *New York.*

DEAR SIR:—I have received your letter of June 20, suggesting that I set down for THE IRON AGE some recollections of my long connection with the iron and steel industry and opinions as to its future. If a brief summary will suffice, I am glad to comply.

100 Tons of Iron Daily, 60 Years Ago

I have been permitted to live in the most interesting period of the metal industry, having participated in the later years of the iron era, having seen the beginning of the age of steel, and having had a modest part in its wonderful development. The most impressive fact of all to me is the amazing growth of steel production.

Having no statistics at hand of the increase in iron and steel over this long period, I may be pardoned, perhaps, for want of a better comparison, in referring to Jones & Laughlin, then a partnership, as typical iron manufacturers, who started operations in 1852, and when I came to them in 1869 made 100 tons of iron per day, and at that were among the largest producers. They changed from iron to steel in 1882, and are now making over 10,000 tons of steel ingots daily. Only our great country, rich in everything material to the progress and well-being of its people, could have made such results possible.

Contrasted Eras

It may be interesting to compare the men and the times. There were no facilities then for communication except limited mail and telegraph service. Letters were hand-written, and banks could not always discount customers' notes, which caused many failures. Competition was severe, not voluntary so much as a necessity for running mills to secure payrolls. Yet, with all their handicaps, the manufacturers were able to supply the limited wants of the time in iron. No great fortunes were made. Mr. Carnegie's star arose after he commenced the manufacture of steel, and he was no more prominent than some others in the iron industry. He was the first to see the coming of steel as a substitute for iron; he had the courage to make vast expenditures, for those days, in building his steel plant, and was fully entitled to the fame and fortune he received. Other prominent iron manufacturers, more conservative, followed him into steel later, and the era of steel was well under way in 1890, in which year 4,277,000 tons of steel ingots were produced. Last year 51,544,000 tons were produced, and at the rate of production over the first six months of this year 58,000,000 tons may be reached in 1929.

Time, perhaps, has cast a glamour over the men of those early days; but it seems to me they had much more than average ability. They were the owners of their properties and had a greater incentive for success. There were not a few outstanding men of unusual force and vision, whose talents would have made them successful as chief executives in the big and strenuous business of today.

New Forces in Selling and in Transport

In looking back I am impressed by the fact that, as business increased, facilities kept pace with its necessities, and always at a time when most needed. History is repeating itself, for at this flood time of business we have two new major agencies which will greatly increase efficiency in operation, merchandising and distribution. One is the recent trade associations, of which many hundreds have been authorized by the Federal Trade Commission, to be guided by the reasonable interpretation of the anti-trust laws by the Supreme Court, which seems to encourage reputable business in cooperation rather than punish it; but they must keep within bounds. The other is the completion of the canalization of numerous rivers, notably the great Ohio and its tributaries. Over 1000 miles from its headwaters at Pittsburgh to Cairo, here is a broad all-the-year waterway through the Mississippi to New Orleans and the Gulf ports. Our corporation has practically had full use of the river for over two years, sending out at intervals tows of 8000 to 10,000 tons of various steel products, although the 53d lock above Cairo has not been entirely completed until recently.

Outlook Highly Favorable

Time has solved many of the troubles of the industry. The money shortage of early days has long passed. A

more recent cause of friction, the question of contract obligations, has been in great part settled by the "hand-to-mouth" buying of the last few years and the nice balance between production and consumption. Overproduction seems have been inherent in the industry from early days, and that trouble, I fear, is ahead of the industry, unless extensions and improvements are kept within reasonable limits. But the natural growth of the country will require more steel; new uses will be found; the railroads, building trades and automobile makers will still be large consumers, and overproduction cannot affect the nearby future. The country is prosperity-minded, and only a great shock can disturb its optimism. Conditions seem to be as ideal as we can ever hope for, and the year 1929 will, I believe, hold the record in tonnage and profits.

Yours very truly,

WILLIS L. KING.

Pittsburgh, July 5.

Hardening Copper and Outdoing the Ancients

AN editorial in THE IRON AGE of June 20 on "Tempering Copper" called attention to the futility of the efforts to which so much attenion is given at intervals in the daily press to rediscover the "lost art of making copper as hard as steel." As no reference was made in the article to what modern metallurgy has done in copper hardening, we give space below to a leaflet on the subject, issued as No. 7, Vol. 7 of "Research Narratives" by the United Engineering Society for its Engineering Foundation. The author is William G. Schneider, research department, Copper and Brass Research Association, 25 Broadway, New York:

"Hardened Copper—A Recovered Art"

"There exists, on the part of those not intimately connected with the working of copper, a belief that the ancients had a method of hardening that metal, with which art we today are not familiar. The fact of the matter is that our present-day metallurgists not only understand how the ancients hardened their copper and bronze, but also know how to produce copper and bronze products that are even harder than those left to us and which represent the evidence of the so-called lost art of hardening copper.

"Cutting edges developed on swords, daggers, knives and other implements by the ancients were obtained by hammering the metal, or in other words cold working. Those old metal workers not only hand hammered their copper implements but also used the same means to harden their bronze articles. The heating of many of these products in open fires resulted in the formation of considerable copper oxide, which alloyed with the copper and hardened it. One of the most common mistakes of persons claiming to have rediscovered 'the lost art of hardening copper' is to heat it in a forge and in this way saturate it with copper oxide, which combines with the copper to form a much harder and much more brittle product.

Two Methods—Alloying and Cold Working

"There are really two methods of hardening copper that are regularly practiced nowadays, just as centuries ago. One consists in alloying the copper with some other metal or several other metals such as zinc, tin, nickel, cadmium, chromium, cobalt, silicon, aluminum, iron, beryllium and arsenic. The second method consists in cold working the metal or copper alloy. In fact, it is possible to work the metal to such a stage of hardness that a slight amount of additional work will cause it to break. The explanation of all copper hardening may be attributed to one of these methods or a combination of them. Microphotographs of an ancient copper spearhead indicated that it was extremely hard and that apparently this hardness had been obtained by cold working the metal.

"Copper scissors, knives and other cutting tools may be obtained. Unless, however, a special reason exists for their use, they offer no advantages over tools made from steel. Occasionally, however, it becomes necessary to use copper or bronze tools, such as knives. Around a powder plant, for instance, where all sparks must be avoided, bronze knives are almost essential.

No Comparison with Steel

"The actual hardness of annealed commercial copper as determined by the Brinell machine is from 40 to 50. The hardness of cold-worked pure copper probably does not ever exceed 120 Brinell. The hardness of copper that has been alloyed with some other metal or a number of metals rarely exceeds 250 Brinell, although a hardness just over 300 has been attained as an upper limit. As a basis of comparison for readers unfamiliar with measurements of the hardness of metals, it may be stated that the Brinell hardness of very 'soft' iron is around 80 and of steel used in common cutlery, such as in a finished pocket knife, about 420 Brinell.

"Not only do many persons spend a short while endeavoring to rediscover an art that never was lost, but some of them devote a whole lifetime to this effort. The tragedy, or rather the denouement, occurs when they have evolved a hard copper. They next endeavor to find some use for it and then learn that, unless it has some special properties, no market exists. Copper wire, hard drawn, has a tensile strength of about 65,000 lb. per sq. in. and an elongation in 10 in. of about 1 per cent, with a conductivity of about 97 per cent. This affords some basis on which to work when endeavoring to develop the hardening of copper. If, for example, it were possible to harden copper so that the tensile strength were materially increased above that just stated, without reducing the conductivity, a worthwhile discovery would have been made.

"Some recent methods of hardening copper by alloying have, to a certain extent, come about as near to actually 'tempering' copper as would seem possible. In these methods the metal silicon plays a most important part because it forms silicides with other metals which in turn form eutectics with the copper. The deoxidizing effect that silicon by itself exerts plays no unimportant part in finally allowing the metal to be worked and by heat treatment to develop a high strength, with a relatively high conductivity. This latter, however, is considerably below that of pure copper and second only, speaking of alloys from the standpoint of both strength and conductivity, to those of copper and cadmium. Alloys of copper with cadmium give, for a stated conductivity, higher strengths than those with silicon."

A program of eight research studies in coal mining and metallurgy will be carried on during the year 1929-30, under the joint auspices of the United States Bureau of Mines, the Carnegie Institute of Technology, and Mining and Metallurgical Advisory Boards composed of mining and metallurgical engineers and executives, it is announced. Eight college graduates have been appointed to research fellowships to make the investigations.

German Foundrymen Meet in Berlin

Committees Active in Many Fields—Suggestions to Improve Electric Furnace Operation—Calory Consumption for Foundry Labor

IN his presidential address before the annual convention of the German Foundry Engineers' Association, held in Berlin, May 24 to 26, Dr. C. Humperdinck, director of the Bruderus Works, Wetzlar, welcomed the 400 delegates coming from all parts of Germany, Austria, Hungary and other countries to the twentieth annual gathering of the association. He emphasized the continued interest in the spirit of research which was accomplishing so much for the good of the industry, and deplored the carelessness with which money is spent for all kinds of purposes in spite of the heavy loads nations have to carry since the cataclysm of the war. This is disastrous to the foundry where the penny must be watched most carefully.

It is the duty of foundry engineers, said the president, to work continually for the recognition of economic requirements in industry, as also in the political progress of the world, and not be swept along with the tide of the times. The time will come when manufacturers can no longer equalize mounting costs with mechanical improvements, and this will react on the ability to market the product. Further, when socialistic endeavor by the state gets to supersede private initiative and the striving for individual profit, these so necessary factors in the prosperity of a country will be crippled and eventually lost. Unless, therefore, an entire realinement of ideas takes place in the near future, the outlook is black and disaster, unemployment and the bread-line are bound to come.

Secretary F. Bock, in his annual report, stated that employment conditions are a little better than last year, but still very bad, as many foundry engineers are unable to find places. Much activity has prevailed in research, this being carried on chiefly by standing committees. The molding sands of Germany are being investigated by one committee, another one has just presented a final report on the number and capacities of arc-electric furnaces. Also there is ready to publish a bibliography of the electric furnace. Another committee is making a series of investigations on high-test cast iron, while other committees are working with brass, bronze and aluminum alloys.

Much attention is being given the subject of the technological education of engineers for the foundry, the final agreement being to have all the societies and trade associations, which are interested, work through the sponsorship of the respective committee of the German Iron and Steel Institute. An investigation is being made on the desirable chemical and physical constitution of foundry coke for melting purposes. Also, there has been taken up the study of alloy additions to cast iron. Apprentice training and cost accounting in connection with the steel, malleable, gray iron and non-ferrous fields complete the program of work being done and still ahead. Much of this is intended to be spread about through courses of lectures and class-room studies.

In connection with the series of papers read at the sessions, the following has been abstracted*:

Improvements in Electric Furnace Practice

K. von Kerpele of Roumania discussed the subject of "Quality in the Electric Steel Foundry." He described a small steel foundry pouring ingots for making steel wire. The entire hearth and walls of the furnace are of standard magnesia brick, the roof being of silica brick. The hearth itself consists of three layers of the brick and a dry-rolled bath bottom on top. This method served better than the usual rammed-up bottom, 20 per cent of patching material being saved in regular operation. At the right of the tapping spout, in the second course of brick, there is left a slit, or opening, 2¾ in. square, to allow a very slight air intake which, coursing under the roof, effectually prevents dripping of the brick. The roof lasts 80 to 90 charges, the period of refining being 2 hr. Consumption of Acheson-Graphite electrodes is 15.4 lb. per 1000 kwhr. Ferrotitanium additions result in high-quality steel. Melting is very hot, pouring slow.

Calories Involved in Foundry Labor

A very odd and interesting paper was read by G. Stern of Frankfort on the "Demand Upon the Operative in Performing Separate Pieces of Work." Mr. Stern has visited the United States and studied production methods. After classifying the steps incident to world-wide production and distribution of castings, he narrows down to a dissection of the slogan "Power-Saving with Profit-Increase," holding that it is necessary, in studying the production of an operative within a given time period, to include the actual consumption of calories, or other units, in this production.

A labor-physiologist, Dr. Simonson, undertook to measure the calories involved in a labor-effort by gaging the consumption of oxygen of the man during the period, as well as getting the carbon dioxide discharged. These figures were obtained for ramming up sand in a mold by hand, by squeezer-press, and by the hydraulic press. Thus, actual figures were obtained showing the great gains in production for the same effort by changing the type of machine for greater efficiency.

Calories Expended Per Mold

In the above example, per mold made, the calories expended were respectively 11,479, 9569 and 5820. On the other hand, the time element comes in also, for the expenditures of calories per minute to obtain this great gain in results were respectively 4049, 5110 and 5640, or an increase. The results brought to parts of a mold per minute, respectively, were 0.353, 0.518 and 0.978. It would follow that it is desirable not only to save time by normalizing mechanical practice, but also to reduce the effort expended per minute without, however, reducing the production intensity.

Tabulating these studies of calory consumption for the separate motions or operations will show the desirability of doing away with operations involving a high expenditure of calories to save the men. These expensive-effort operations are usually connected with work extraneous to the actual objective. Thus, in making a mold, there is the movement of flask parts, shoveling sand, striking off, etc., much of which can be obviated by the designer of molding machinery who knows his business. Easing the labor in squeezing the mold by effective mechanical arrangement, etc., all intended to save the man while increasing his production, should be the watchword of advancing civilization.

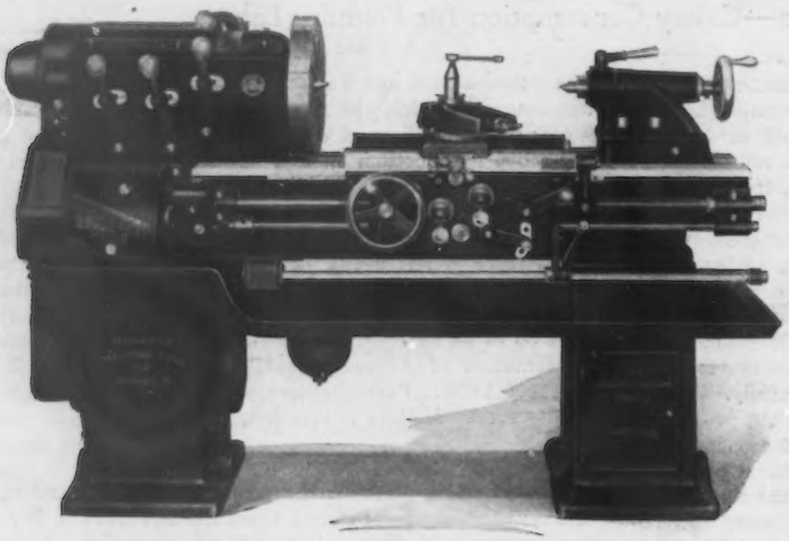
*By Dr. Richard Moldenke, Watchung, N. J.

Designs Lathe for Tungsten Carbide Cutting Tools

TO meet the demand for lathes that will operate smoothly and quietly at much higher than the usual spindle speeds, the Monarch Machine Tool Co., Sidney, Ohio, has brought out a new line. Sizes range from 14 to 36 in. swing, and spindle speeds from 600 to 1500 r.p.m. The machines are said to meet the specifications drawn by research engineers for obtaining the best results with Carboloy, Widia and other tungsten-carbide cutting tools.

Helical gears and Timken roller bearings, features of previous Monarch lathes, supply two main essentials for the higher spindle speeds, and therefore only moderate changes were necessary to adapt them for the tungsten-carbide tools. It is said that work may be turned at speeds never before attempted with high-speed steel tools, and even at top speed no vibration or gear tooth marks are shown. Cast iron is being machined at from 500 to 700 ft. per min. and other materials at corresponding speeds. The new machines may be used economically also at the slower speeds necessary for steel tools.

Tests are said to show that to secure maximum results with the new tungsten-carbide cutting tools, at least twice the power is required as for a lathe designed to use high-speed steel tools, this being due to the much greater amount of metal removed in a given time.

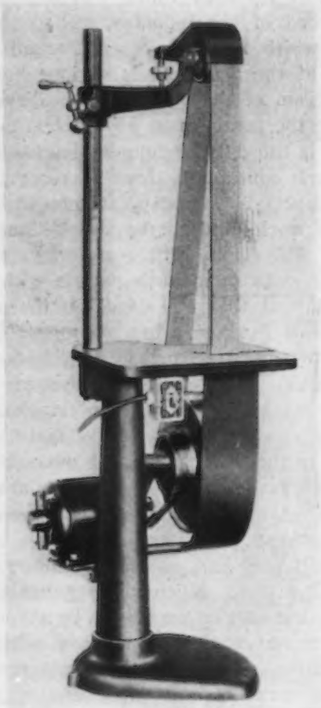


Helical Gears and Tapered Roller Bearings Are Among the Features Adapting the Lathe for Use at Speeds Up to 1500 R.P.M.

Irregular Belt Sander and Grinder

A PORTABLE motor-driven sander and grinder weighing 265 lb. net is being put out by the Porter-Cable Machine Co., Syracuse, N. Y. This machine, as shown in the illustration, has a table 13 by 19 in., which is 33¾ in. from the floor. It uses belts ½ to 3 in. in width and with lengths of 95 to 125 in.

Abrasive belt speed is either 1975 ft. a minute for wood or 3425 ft. a minute for metal. Power is transmitted from the motor to the drive pulley by a belt. This fact, together with the rubber covering on the pulleys over which the abrasive band travels, insures quiet operation.



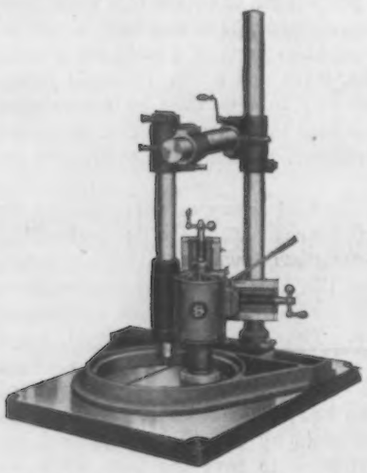
Metal or Wooden Pieces of Irregular Shape May Be Sanded Conveniently

Overall dimensions are 22 by 27 in. by 65¾ in. high. A motor of ½ hp., with ball bearings, is standard equipment.

Grinder for Surfacing Die Blocks and Other Work

FOR surfacing die blocks, grinding manholes and flat work within a minimum circumference of 24 in. the United States Electrical Tool Co., Cincinnati, has designed the special electric grinder here illustrated. The drive is by a 2-hp. Westinghouse motor running on SKF ball bearings, the lower bearing being of combination radial and thrust type. The surface of the base, which is machined true, is 36 x 48 in. The T-slots provided for clamping down work start from the rear and extend about three-fourths of the distance across the base.

The upright column is made from 3½-in. steel tubing and is 48 in. high. The upright is equipped with a stop collar. The cross arm, also of 3½-in. steel tubing, is 36 in. long. The arm holding the grinder is 3-in. diameter cold rolled steel and the grinder mounting collar is equipped top and bottom with ball bearings. The mounting has two adjustments, 6-in. vertical and 8-in. horizontal. The dovetail slides have adjustable gibs. The machine is regularly equipped with a 6-in. cup wheel and 12 ft. of rubber covered cable with attachment plug.



The Grinder Mounting Is Adjustable 6-In. Vertically and 8-In. Horizontally

Safe Practices in Handling Material

A pamphlet of 12 pages devoted to handling material with mechanical equipment has been published by the National Safety Council, 108 East Ohio Street, Chicago. This is called "Safe Practices Pamphlet No. 55." It is a compilation of experiences in accident prevention and is largely illustrated. It follows a previous pamphlet on handling materials by hand and by truck. Many types of equipment are shown in use, and the possibilities of danger in connection with this equipment are pointed out.

Lapping Soft and Hardened Gears

Carborundum Brand Compounds Developed for Variety of Conditions—Methods of Application Described

BY H. J. WILLS*

LAPPING is an important operation wherever quiet and smooth running gears are essential. It removes cutter marks, imperfections in tooth profile and spacing, and corrects distortions caused by heat treatment. Many gears formerly scrapped because of minor surface imperfections are now reclaimed by the lapping process.

Soft metallic gears are usually mounted on an arbor between the centers of a lapping machine having adjustments for varying the mesh of the gears. Because of their comparatively small diameters, hardened steel gears are usually mounted on a lathe and lapped on centers only. If the lapping machine equipment has adjustments for varying the mesh of the gears, it is recommended that the gears be lapped in all three positions, that is, on close, wide and on running centers.

Carborundum brand finishing compound should be applied with a paint brush after the gear has been mounted and is in motion. Sufficient compound should be used to wet the entire surface of the gear teeth and in the case of very large gears, the surface of the teeth should be moistened with kerosene or machine oil before applying the compound. Best results are obtained if the gears are lapped under light load and at speeds that will not cause the compound to fly, a speed just below the point where the compound would be thrown from the gears being the most desirable. Frequent examination of the lapping action is necessary on the first gears lapped in order to determine the time required to obtain the desired results.

Successful operation of any compound depends a great deal upon selection of the proper grading for each specific class of work. For the lapping of soft metallic gears, Carborundum brand finishing compound in WL5-4 coarse, WO5-4 medium or WR5-4 fine, depending on the size and condition of the gears, may be used. For exceptionally high finish, the grading HX2-40 is recommended.

For the lapping of hardened steel gears, the RL4-4 grading may be used for a fast cut on rough gears, but where the gears are small and smooth finish essential, a special and finer grade, the RT4-4 has been developed. For hardened steel gears lapped in with soft metallic companion gears, the compound recommended for soft gears should be applied.

Lapping of worms and wormwheels is one of the simplest of all gear lapping processes. When lapping worms only, the worm is mounted between centers on a driven spindle. A cast-iron, brass or micarta lap made to the same form as the companion worm-wheel is mounted on a two-way carriage and after pressing the lap firmly into the worm threads, the machine is started and the compound applied with a brush while the lap traverses the worm once in each direction the full length of the threads. Worms up to about 2 in. in diameter are lapped by this method in from 5 to 10 sec. The most suitable grade of Carborundum brand compound for the larger diameters is the RT4-4; for the smaller worms the grading RU4-9 is more efficient. Where tool marks are deep, regardless of the diameter of the worm, the grading RS4-9, which is a faster cutting compound, is the most satisfactory.

When lapping worms and wormwheels simultaneously, the machine set-up is the same as in lapping worms only, except that the wormwheel takes the place of the manufactured lap. The grading WR5-4 is usually suitable for this operation unless a coarser grading is required, when the WO5-4 grading is recommended.

The foregoing methods apply to lapping on a production basis. Where production is small and more or less intermittent, or where lapping machine equipment is not available, the worms and gears can be assembled and lapped in their housings. If this method is employed, the compound should be applied sparingly so that it will not flow or drip into the bearings or housings.

Although the abrasive content in the compound does not charge or impregnate the metal, the parts should be thoroughly cleaned after lapping to remove any loose particles of abrasive. This cleansing is best accomplished by brushing or spraying the gears either with kerosene or hot water.

*Engineer, Carborundum Co., Niagara Falls, N. Y.

New ¼-Ton Electric Hoist

A YALE ¼-ton electric hoist, providing rapid and safe handling for lifting light loads, has been added to the line of the Yale & Towne Mfg. Co., Stamford, Conn. Suspension is structural steel plate arranged for either hook or trolley type of hoist. The trolley is adjustable to fit I-beams from 4 in. to 9 in. The hoist has been designed to operate where space is limited and close headroom is required.

Trolley wheels are made of pressed steel and are mounted on ball bearings. Zerk fittings are provided, for grease lubrication. The fully inclosed motor has ball bearings. As a. c. and d. c. motors are built to the same dimensions, they are interchangeable on the hoist frame. The motor has a magnetic brake to stop the machine quickly, and prevent coasting when the current is shut off.

This hoist can be furnished in either the manual or push-button type. Controllers are ruggedly constructed and all parts are accessible. A planetary gear reduction is used, operating in oil in a fully inclosed housing. The chain drive from the motor to the sprocket and all the lowering brake parts are fully inclosed in a housing and operate in oil.

The load sheave is a bronzed bushed, electric steel casting, turned and ground to concentricity for the large chrome-vanadium steel bearing races. The driving pinion that passes through the load sheave is machined from a single drop forging, then heat-treated, with the bearing surfaces on the shaft ground to 0.001 in.

An automatic stop mechanically connected with the controller shuts off the power when the upper or lower limit of hook travel is reached. The brakes are immediately applied and hoist brought to a stop.

STRUCTURAL Steel Plate Forms the Suspension Member of the New Low-Head Hoist Illustrated. Limit stops provide for safety

Proportional Freight Rates Allowed

Interstate Commerce Commission Approves Tariffs Giving Lower Rail-and-Water Rates to Southwest

WASHINGTON, July 9.—The Interstate Commerce Commission this afternoon decided not to suspend the proportional rates on iron and steel products proposed by the Pennsylvania Railroad and the Central Freight Association territory railroads. The tariffs will become effective July 10.

Protests were made by the Chicago Association of Commerce, in behalf of Chicago iron and steel producers; by the Youngstown Chamber of Commerce, in behalf of steel companies in that district, and by the Bethlehem Steel Corporation.

By this decision, steel companies at McKeesport, Pa., and Bessemer, Pa., Depew, N. Y., and at other points in or very near to the Pittsburgh and Buffalo steel-producing districts will be able to ship their products to the Southwest at rail-and-water rates via the Mallory, Morgan and Southern steamship lines and their connections in the Southwest. These tariffs have been in effect since Feb. 21, 1928, but the rates have not applied from the points which now are to receive this benefit.

Tariffs filed by the ocean lines and their Southwestern connections make rates from some middle steel district points to the Southwest on the basis of the ocean lines absorbing the local rates of the Eastern railroads to the North Atlantic ports. For example, they publish a rate of 74c. on wrought pipe from McKeesport, Pa., to Dallas, Tex. The local rate on pipe from McKeesport to New York is 34c. a 100 lb. The ocean-and-rail lines stand the cost of getting the pipe to the port, including lighterage, or other service, if any. They have left for themselves 40c. a 100 lb.

While McKeesport and Bessemer, Pa., are in the Pittsburgh rate district and the rate to New York is the same as the rate from Pittsburgh, Pittsburgh is not one of the points from which the ocean-and-rail rates apply. If the Pittsburgh steel company desires to use the ocean-and-rail rate to the Southwest, it must pay to get its steel to New York.

To overcome the handicap caused by that situation, the Pennsylvania proposed a proportional rate, applicable only on traffic going beyond McKeesport, of 10c. a net ton. In that way the Pittsburgh shipper will be able to get to Dallas on a 74.5 cent rate or only ½c. higher than the McKeesport shipper.

From Youngstown it is proposed to establish a proportional rate of 3.5c., which is exactly the difference between the local rates from Youngstown and McKeesport to New York. From Cleveland to McKeesport the proportional rate named in the tariffs is 6c. a 100 lb.

By means of these proportional rates the railroads serving mill points other than those named in the ocean-and-rail tariffs propose to put those points on an equality with McKeesport, Bessemer and other points from which the ocean carriers have published the rates.

In every instance the Eastern railroads, under the proposed rates, will collect all or more than their local rates to the ports. Youngstown will get into Dallas, for instance, on a rate of 77.5c. on pipe. At present Youngstown, if it ships pipe to Dallas, must pay a local rate of 11c. to McKeesport, plus the 74c. ocean-and-rail rate from that point.

This sort of an adjustment is to apply from all the eastern Ohio, western Pennsylvania and New York and northern West Virginia mill ports to all the North Atlantic ports via which the ocean-and-rail routes and rates are in operation, subject to the customary port differential adjustment.

The Chicago Association of Commerce, in its petition, said, it spoke for the Acme Steel Co., Clayton Mark & Co., Inland Steel Co. and the Interstate Iron and Steel Co. They ship on all-rail rates to the Southwest. The proportionals will increase the area from which competition with them in the Southwest will come. The Bethlehem corporation protested on account of the increased competition brought about in the way indicated.

Canadian Output of Iron and Steel Products Increased

TORONTO, ONT., July 9.—Iron and steel products manufactured in Canada during 1928 were valued at $607,731,226, or $32,000,000 above the total for 1927, according to preliminary statistics issued by the Dominion Bureau of Statistics. The estimate is based on reports from 1163 manufacturing establishments. Fixed and operating capital reported by these concerns totaled $721,454,764, employees numbered 118,869, salaries and wages totaled $166,837,357, materials cost $306,764,663 and value added by manufacturing was $300,966,563. In 1927, the number of plants was 1148, capital was $638,914,893, number of employees was 106,293 and materials cost $261,102,679. Plants in the iron and steel industry are classified in 13 industrial groups, arranged according to principal products. Twelve of these groups had a higher output in 1928 than in the previous year.

Imports into Canada of iron and steel products during 1928 were valued at $322,959,144, compared with $248,151,554 in 1927. Over 91 per cent, or $295,114,281, of the imports in this class came from the United States and about 5 per cent, or $17,762,561, from the United Kingdom.

Canadian exports of iron and steel in 1928 reached a value of $70,665,677, as against $67,831,374 in 1927. The principal countries to which Canada exported iron and steel goods in 1928 were: United States, $9,216,896; United Kingdom, $8,416,250; Argentina, $6,784,262; Australia, $7,387,236; British India, $6,377,739; New Zealand, $5,421,763; Brazil, $3,162,412; British South Africa, $2,953,139; British East Indies, Chile, Germany and Dutch East Indies, over $1,000,000 each. In addition to the above, foreign iron and steel products reexported from Canada during 1928 was valued at $4,164,254, compared with $3,113,235 in 1927. Of this year's total, $3,952,464 went to the United States and $117,318 to the United Kingdom.

New Company to Build Long Gas Lines

The Central States Natural Gas Co. has been incorporated under the laws of Delaware for the purpose of building a pipe line for natural gas from the Texas Panhandle to Chicago, as well as to other cities en route. This corporation will acquire the natural gas rights and natural gas wells on 132,000 acres of land in the Texas Panhandle from the Texas, Phillips, Skelly and Columbian Carbon companies. It is also reported that the same interests have in mind the construction of a natural gas pipe line from the Texas Panhandle to points in Nebraska, Iowa and other areas.

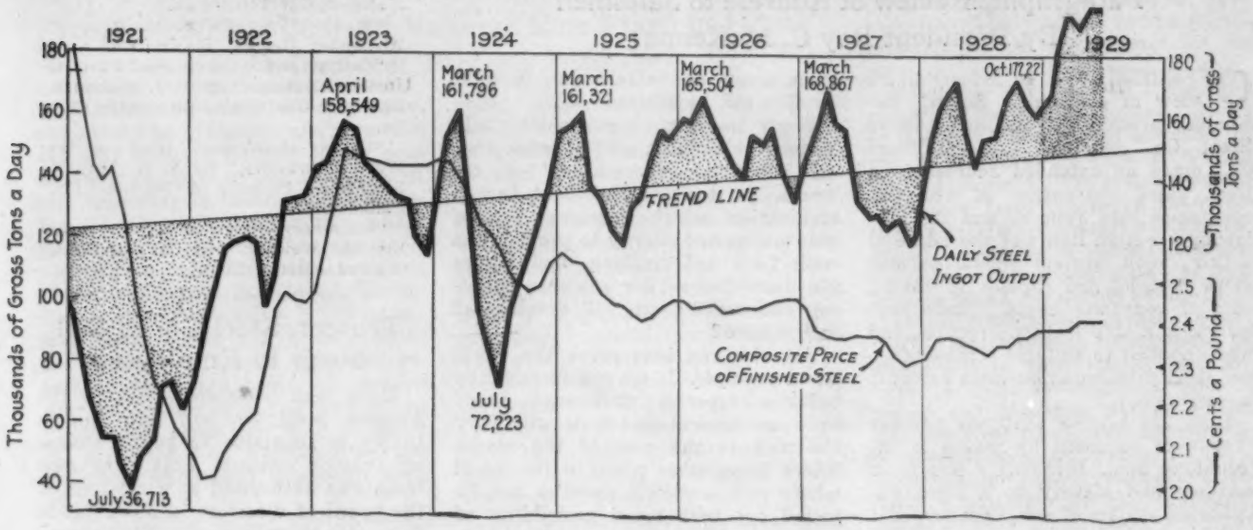
Directors of the Central States Natural Gas Co., will be R. C. Holmes, president, Texas Co.; R. Ogarrio, vice-president, Texas Co.; Frank Phillips, president, Phillips Petroleum Co.; W. G. Skelly, president, Skelly Oil Co., and Reid L. Carr, secretary, Columbian Carbon Co.

Imports British Airplane and Axle Tubing

Aeronautical tubing, including the streamline, round, oval, crescent, cowl ring, letter D, square, hexagon and other sections, made by the Reynolds Tube Co., Ltd., Birmingham, England, can now be obtained from A. Milne & Co., 745 Washington Street, New York. According to H. S. Hoyt, of the Milne company, who recently returned from a trip to England, the tubing is available under United States Government specifications, and that axle tubes, taper gage tubes and other products of the Reynolds company are included in the American representation arranged by Mr. Hoyt.

Civil service examinations for physicist, $3,800 a year, associate physicist, $3,200, and assistant physicist, $2,600, for Government Bureaus are announced. Applications must be on file not later than Aug. 14 with the United States Civil Service Commission, Washington.

Ingot Production in June Held Closely to the Record-Breaking Daily Rate of May. The trend line shows a normal growth of about 1,013,000 tons a year. Prices in June were 3 per cent better than at midyear of 1928



Record Half-Year in Steel Ingots

June Production Brings Total Close to 29,000,000 Tons—Four Successive Months Each Higher Than Any Month in Any Preceding Year

WHILE production of steel ingots in June showed a drop of almost 400,000 tons from the record-breaking total of May, it represented nevertheless the largest month's tonnage, by more than 200,000 tons, which had ever been achieved previous to last March. On the daily basis, the May record of 195,302 tons for each of the 27 working days of the month was almost precisely equalled with 195,255 tons daily for 25 days in June.

Open-hearth production in June fell off 9 per cent from that of May. Bessemer production fell off 12 per cent from the highest Bessemer tonnage which had been made in many months.

For the first half of the year the calculated monthly output, as reported by the American Iron and Steel Institute, was 28,967,174 gross tons. This is 17 per cent ahead of the 24,798,073 tons for the first half of last year, which was the largest first half ever before reached. The current tonnage is almost 4,000,000 tons ahead of the 25,067,122 tons of the second half of 1928, which was the largest half-year's tonnage previous to the present.

All of these figures relate to open-hearth and Bessemer ingots only, as electric and crucible steel ingots are no longer reported monthly by the Institute. Ingots of those two types of steel amounted to 460,208 tons in 1928. This works out at an average of about 1480 tons a day. A figure of some such magnitude would have to be added to each of the recent daily averages to obtain the total outpouring of steel ingots from American furnaces.

For a full year, July 1, 1928, to June 30, 1929, production of Bessemer and open-hearth ingots has been 54,034,296 gross tons. This figure may be compared with 49,865,185 tons, the record-breaking tonnage of the calendar year 1928. The advance, allowing for one less working day in the current figures, is 8.7 per cent.

Particulars for the past 18 months are shown in the table. The diagram traces the course of ingot production and finished steel prices over the past 8½ years.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(GROSS TONS)

1928 Months	Reported by Companies Which Made 94.51 Per Cent of the Steel Ingots in 1928		Calculated Monthly Output All Companies	No. of Working Days	Approximate Daily Output All Companies
	Open-Hearth	Bessemer			
January	3,273,294	498,691	3,990,902	26	153,496
February	3,300,407	521,250	4,043,457	25	161,738
March	3,692,648	567,330	4,507,217	27	166,934
April	3,505,104	564,110	4,305,382	25	172,215
May	3,394,301	582,128	4,207,212	27	155,823
June	3,010,341	528,193	3,743,903	26	143,996
Six months	20,176,095	3,261,702	24,798,073	156	158,962
July	3,068,257	528,588	3,805,598	25	152,224
August	3,379,625	569,771	4,178,610	27	154,763
September	3,375,654	544,710	4,147,893	25	165,916
October	3,795,800	599,098	4,649,968	27	172,221
November	3,442,112	590,669	4,266,835	26	164,109
December	3,301,114	496,679	4,018,208	25	160,728
Year	40,538,657	6,591,217	49,865,185	311	160,339
1929					
January	3,694,218	549,616	4,490,354	27	166,309
February	3,599,224	489,279	4,326,000	24	180,250
March	4,183,869	596,691	5,058,258	26	194,548
April	4,026,576	640,351	4,938,025	26	189,924
May	4,276,186	707,484	5,273,167	27	195,302
June	3,990,798	622,585	4,881,370	25	195,255
Six months	23,770,871	3,606,006	28,967,174	155	186,885

Orders for steel building products received by the Truscon Steel Co., Youngstown, Ohio, during the first six months of 1929 were 33 per cent greater than in the same period last year. A considerable percentage of the tonnage was for material for airplane hangars, such as doors, windows, roofs, floodlight towers, reinforcing steel and complete hangars.

Staccato Touches on Industrial Economics

Paragraphic Review of Address to Salesmen By President Roy C. McKenna

OFFERING it as an industrialist's view of economics, Roy C. McKenna, president Vanadium-Alloys Steel Co. and the Colonial Steel Co., made an extended address to a joint sales convention of the two companies held June 27 and 28. Following are high lights of the address:

Our credit system should become more flexible, and capable of taking care of consumer needs. Instalment selling is a step in this direction, and when applied to suitable commodities, and used with sound business sense, it is desirable.

I do not believe that our present system of payment by wages is infallible or final. It is only a step from serfdom and slavery to a more enlightened system of compensation that will be worked out from generation to generation. In America practically all corporations, large or small, welcome the public, and particularly employees, as stockholders. Generally speaking, most employees are capitalists to the extent that they are stockholders; and almost without exception every capitalist is also a worker. The management of industry is more and more coming into the hands of experts, men who themselves are not large stockholders, and cannot be considered as owners. These men value the good opinion of their fellow-workers and associates as much, if not more, than that of the stockholders.

Labor is being more and more treated as overhead, and capital is being treated less and less as overhead. The tendency is toward labor employing capital rather than capital employing labor. This trend shows up in new financing, for when additional money is needed it is more often secured by the sale of equity stock rather than by the issuing of bonds.

Education enables labor to change more easily from job to job as conditions demand. We must continue to give our boys and girls the best of education at the minimum of individual expense. Much of labor that is unemployed is really nonemployable.

Mass production must be accompanied by mass consumption, and mass consumption is attainable only by intensive salesmanship. Yet intensive salesmanship and mass production are incompatible. Mass production implies simplification and standardization. Intensive salesmanship demands that the whims and fancies of the buyer must be met and that changes be made that render apparatus obsolete or out-of-date before its usefulness is ended.

Our successful industries are those which are leaders in research and in the application of scientific knowledge. The American investor recognizes this, and places less value upon tangible assets than upon the intangible value of a loyal, progressive organization under good leadership. Tangible assets are valuable only in so far as they can be utilized.

Many thinkers of our older civilizations "view with alarm" what they call the "Americanization" of the world. Is it not self-evident that a civilization which requires less of man's time and energy to provide him with food and clothing, and allows him more leisure for reading, studying and amusement, will develop art and science?

America can best serve the world as an example. If we can successfully build a superior civilization based upon mechanical power, it will show the way to the rest of the world. There is no other place in the world where new economic theories can be tested out with equal probability of success, and less penalty to the whole in case of failure. Half of the purchasing power of the world is concentrated in America.

Papers on Welding at the National Metal Congress

The American Welding Society, through Chairman P. W. Swain of the meetings and papers committee, announces the papers to be presented during the fall meeting of the society to be held in Cleveland the week of Sept. 9 as its part of the National Metal Congress. The iron and steel divisions of the Mining and Metallurgical Engineers and of the American Society of Mechanical Engineers, the Institute of Metals and the American Society for Steel Treating will have conventions in Cleveland during the same week. During the National Metal Congress the National Metal Exposition will be held, of which over 10,000 sq. ft. will be devoted to exhibits of welding and cutting equipment and supplies. Some 30 firms dealing in this material already have made reservations.

The papers to be presented by the American Welding Society are as follows:

"Non-destructive Tests of Welds," by Elmer A. Sperry, Sperry Development Co., Brooklyn.

"X-Ray Investigation of Welds," by Dr. H. H. Lester, Watertown Arsenal, Watertown, Mass.

"Oxy-acetylene Welding of Pipe Lines in the Field," by W. R. Ost, Air Reduction Sales Co., New York.

"Welding of Pipe Lines," by H. C. Price, manager, Welding Engineering Co., Bartlesville, Okla.

"A Metallographic Study of Some Metallic Arc Welds," by Prof. H. M. Boylston, Case School of Applied Science, Cleveland.

"Welding of Copper and Copper Alloys," by Mr. Hook, research laboratory, American Brass Co.

"Welded High Strength Aluminum Alloys for the Aircraft Industry," by Mr. Dawson, research laboratory, Linde Air Products Co., New York.

"Foreign Practice in Welding of Boilers, Tubes and Drums," by G. A. Orrok, consulting engineer, New York.

"Stress-Strain Characteristics of Welded Joints," by Prof. J. H. Smith, University of Pittsburgh.

"Study of Nitroid Needles," by P. Alexander, General Electric Co.

"Cutting and Welding Steel Parts to Replace Castings," by W. J. Buchanan, Bessemer Gas Engine Co., Grove City, Pa.

"Testing Equipment Used in the Welding Industry," by V. G. Tatnall, Southwark Foundry & Machine Co., Philadelphia.

"Machinery Design as Influenced by Electric Welding," by H. G. Boist, General Electric Co.

Truscon Steel Co. to Sell Stock to Employees

More than 5000 employees of the Truscon Steel Co. will have opportunity to subscribe to 20,000 shares of Truscon common stock. The new issue was authorized at a meeting of the board of directors in June. It is to be sold to employees at $40 a share. The present market value is about $60.

Each employee may purchase stock up to 20 per cent of his 1928 earnings. The company reserves the right to pro-rate the issue if it is over-subscribed. A partial payment plan is offered.

Stove Pipe Makers Form Trade Group

A new group has recently been formed in the Metalware Institute, Inc., 342 Madison Avenue, New York, composed of manufacturers of stove pipe, elbows and drip pans. It is functioning along lines recognized as legal and proper and some of the objects of the stove pipe group are: To discuss legislation, transportation, insurance, manufacturing and related problems; to establish a system for investigating credits and collecting information concerning the character and standing of purchasers; to establish a bureau of statistics for stocks on hand, production, unfilled orders, shipments, orders received, actual prices at which orders accepted were sold, etc.; to cooperate with the Division of Simplified Practice existing in the Department of Commerce to obtain the elimination of obsolete or unnecessary varieties, styles, and sizes; and to collect quarterly departmental labor costs and labor efficiency ratios.

Automobile Output Attains New High Record

With June production of cars, trucks, and buses totaling approximately 536,309 units, the National Automobile Chamber of Commerce estimates that the automobile industry set a new record in the first half of 1929 in manufacturing 3,380,088 vehicles. This exceeds the same period of 1928 by 1,053,579, or 45 per cent. June output was the highest for that month and showed a gain of 26 per cent over June, 1928.

Cast Iron Pipe Makers Want Higher Duty

Approve 30 Per Cent Ad Valorem Rate Fixed in House Bill—Importer Protests Increase

WASHINGTON, July 9.—American cast iron pipe producers are generally satisfied with the duty of 30 per cent ad valorem fixed in the House tariff bill, according to testimony given befor the Senate sub-committee which is considering the metal schedule.

Filing a brief for 10 cast iron pipe foundries, F. S. Russell, United States Pipe & Foundry Co., Burlington, N. J., asked for a duty of 30 per cent with a proper method of determining foreign costs, or, preferably a specific duty. A similar request was made by Walter Wood, R. D. Wood Co., Philadelphia, who definitely suggested a specific duty of 6/10c. a lb.

"The bill as passed by the House gave a 30 per cent ad valorem duty," said the brief filed by Mr. Russell. "If the administrative features of the bill are such that the importer must prove to the satisfaction of the Government that valuations at which they are importing are not lower than prices at which similar material is offered for sale in the usual quantities in their home market, and if the American manufacturer is permitted to be a party to such proceedings, the members of the industry which I represent, while preferring a specific duty, acquiesce in the rates given by the Ways and Means Committee. I firmly believe, however, that past experience has shown that, in the absence of an American valuation as a basis of ad valorem duties, specific duties would work out to the best interests of all concerned."

Says Industry is "At War"

Mr. Wood said that the duty of 30 per cent would be protective, but not prohibitive, and would mean a strong struggle against French importations. He said that imports are to be compared with production of American pipe foundries along the seaboard, and not with the total production. Mr. Wood told the committee that he had been told that the French pipe price in France is $35 to $37 a ton, much less than the price at which it is sold in the United States, thus implying that the French product is being dumped in the American market. American costs at the plant were said to be $35 to $36 per net ton.

"But you have been selling at $30, haven't you?" inquired Senator King.

"Certainly, sir; we are 'at war,'" said Mr. Wood.

Senator Reed asked Mr. Wood if the latter had imported pig iron from England. Declaring that he understood he was going to be "twitted" about the matter, Mr. Wood admitted that he had bought pig iron from England and had to do so in order to keep his plant going and his workmen employed. The price of the English iron at the time was said to have ranged from 50c. to $1 a ton under domestic prices. Mr. Wood said he could not have paid the latter prices and kept his plant going. He said that no imports of any size are now coming from England, France or Germany, but he thought Indian imports would continue because of the extremely low wages paid in India. Mr. Wood said he never used Indian iron because it goes into better manufactures than cast iron pipe. Replying to a query by Senator Reed, Mr. Wood expressed the opinion that pig iron is entitled to a somewhat higher duty than that of $1.125. Merchant furnaces in this country, he stated, can barely live at the present duty.

Herbert Kennedy, Herbert Kennedy Co., New York, importer, protested against the increase to 30 per cent provided in the House bill for cast iron pipe. The existing duty is 20 per cent. He said that the cost of production at the Pont-à-Mousson foundry in France, which he represents, is never below $20 a net ton and that the difference in French and American costs are not great enough, when other charges, such as the duty, inspection, freight rates, etc., are taken into account, to justify a higher tariff. He also said that imports of cast iron pipe from France are decreasing and indicated that this was due in part to increased efficiency by American producers through the use of the centrifugal process. He told the committee that he is head of Intercontinental Pipe & Mining Co., recently organized, with a view to erecting a plant in Massachusetts to meet domestic requirements. His company, he stated, would be satisfied with the duty of 20 per cent.

A. C. Dinkey, Midvale Co., Philadelphia, asked for an increase to 60 per cent in the duty on reaction chambers. The House bill carries a duty of 40 per cent.

French Cast Iron Pipe Plant Here Going Ahead

The Intercontinental Pipe & Mining Co., 475 Fifth Avenue, New York, recently incorporated in the United States by the Société Anonyme des Hauts Fourneaux et Fonderies de Pont-à-Mousson at Pont-à-Mousson, France, to build a plant here, has engaged Fay, Spofford & Thorndike, 44 School Street, Boston, as consulting engineers for the project. A contract for construction of a wharf and bulkhead and for dredging and filling in the river on the company's property at Chelsea, Mass., has been awarded to the Bay State Dredging & Contracting Co., Boston, and work will begin at once. The Boston & Maine Railroad is building a spur and siding on the property. Plans for the foundry, which will have an annual capacity of 150,000 tons of cast iron pipe, ranging from 4 in. to 24 in., have been completed and the company will probably award the contract for its construction in a few weeks.

According to Herbert Kennedy, agent for the Pont-à-Mousson Works in the United States and an officer of the Intercontinental Pipe & Mining Co., equipment for the foundry will be purchased from American manufacturers, except for certain special machinery used in a development of sand-spun centrifugal pipe, the patents on which are owned by the Pont-à-Mousson Works in France.

The wharf being constructed at Chelsea is to serve the twofold purpose of shipping cast iron pipe by water and importing North African iron ore from two mines controlled by the Pont-à-Mousson Works, the ore to be furnished to the furnace at Everett, Mass., adjacent to the company's plant.

Chicago Railroads Denied Lower Rate to Milwaukee

Western railroads which serve Milwaukee from Chicago have been refused by the Interstate Commerce Commission permission to establish a 7c. rate on iron and steel moving between these two points.

The Chicago & North Western, Chicago, Milwaukee, St Paul & Pacific, Elgin, Joliet & Eastern and the Minneapolis, St. Paul & Sault Ste. Marie entered this plea on the contention that lower rates are necessary to meet water competition.

Denial was based on the fact that this request is contrary to the intent of the long and short haul clause of the fourth section of the act to regulate commerce. These railroads are now preparing to enter a plea for an 8c. rate between these two points.

With the opening of navigation, round tonnages of steel moved by boat from Chicago mills to Milwaukee, and as the season has advanced an increasing number of cargoes of steel have moved from Western mills to points of consumption on the Great Lakes.

Illinois Steel Expansion Will Be 1,500,000 Tons

Illinois Steel Co. has announced that it will increase steel producing capacity at its South and Gary Works to the extent of 1,500,000 tons annually. This plan includes the construction of 14 open-hearth furnaces, blooming and slabbing mills, a structural mill and two plate mills. Construction will be commenced at once. The steel ingot capacity of mills in the Chicago district is normally computed at 10,200,000 tons annually. The construction program which is being undertaken by the Illinois Steel Co. will increase output in that district by about 15 per cent.

Industrial Leaders Direct Standardization

On July 9 the first board of directors of the American Standards Association, a national federation of 40 technical, trade, and industrial organizations and Government departments will organize. Recognition by industrial executives of the savings to be made through standardization led to reorganization of the association to place control of standardization policies into the hands of industrial leaders. Announcement of the move was made by James A. Farrell, president United States Steel Corporation, and, since 1925, chairman of the advisory committee of the American Standards Association.

The board of directors will include in its membership Matthew S. Sloan, president of the New York Edison and affiliated electric companies; L. A. Downs, president Illinois Central Railroad; Bancroft Gherardi, vice-president American Telephone & Telegraph Co.; F. E. Moskovics, president Improved Products Corporation; Quincy Bent, vice-president Bethlehem Steel Co.; Howard Coonley, president Walworth Co.; C. L. Collins, president Reliance Electric & Engineering Co., and Dr. George K. Burgess, director United States Bureau of Standards.

One of the questions to be considered is that of American participation in international standardization activities. The International Standards Association, an affiliation of the national standardizing bodies of Austria, Belgium, Czechoslovakia, Denmark, Finland, France, Germany, Holland (with reservation), Hungary, Italy, Norway, Russia, Sweden and Switzerland has formally invited the American Standards Association to its membership. Although the American body was represented in the organization of the International Standards Association, membership has been kept pending to await the action of the board of directors. The International Standards Association now maintains an office at Baden, Switzerland.

The full control of national standardization policies, since the organization of the American Standards Association as the American Engineering Standards Committee in 1919 has been entirely in the hands of engineers and scientists. The reorganization which led to the formation of the board resulted from the increasing interest of industrial executives in national standardization work. The meeting of the board is expected to be followed by an intensive campaign to finance national standardization activities on a larger scale than heretofore.

Human Relations Is Topic of Conference

Stability of employment, the older worker's place in industry, getting the most out of the personnel department and larger conceptions of safety are among the major themes to be discussed at the twelfth annual conference on human relations in industry at Silver Bay, Lake George, N. Y., Aug. 28 to Sept. 1. The conference will be preceded by industrial leadership courses beginning Aug. 20.

Industrial Advertisers to Meet in Cincinnati

The eighth annual convention of the National Industrial Advertisers Association will be held in Cincinnati, Sept. 30 and Oct. 1 and 2. Arrangements for the meeting are in the hands of Jesse R. Harlan, chairman of the convention committee of the Cincinnati Association of Industrial Advertisers. Mr. Harlan is advertising and sales manager of the Stuebing-Cowan Co., Cincinnati. Sub-committee chairmen are: Sherman Perry, American Rolling Mill Co., Middletown, Ohio, program; C. Kenneth Magers, Union Gas & Electric Co., Cincinnati, publicity; Samuel Glueck, Key Advertising Co., Cincinnati, exhibits and panels; R. W. Bohnett, Bohnett Co., Cincinnati, entertainment; Frederick B. Heitkamp, Cincinnati Milling Machine Co., attendance; George Gauff, *Manufacturers Record*, hotel and registration, and William Heilig, William Powell Co., Cincinnati, transportation.

Data Service in Steel Construction

A technical data bulletin service for the benefit of its members has been started by the American Institute of Steel Construction, New York. The first bulletin, which is of four pages, deals with the effect of temperature on structural steel. Succeeding bulletins will contain the results of engineering research and latest technical information regarding design and fabrication, and will outline the best methods to be pursued in designing or erecting steel structures.

Metallurgical Congress in Belgium Next Year

An international congress of mines, metallurgy and applied geology is to be held at Liége, Belgium, toward the end of June next year. A congress of the same description was held in Düsseldorf in 1910 by the Iron and Steel Institute (British), the Institution of Mechanical Engineers, the Institute of Metals, and five other organizations, but the handling of the coming congress will be directly in the hands of the association of alumni of the engineering school of Liége and the Belgian Geological Society. The congress has been scheduled for Liége because in 1930 will occur the Liége International Exhibition. O. Lepersonne, 16 Quai des Etats-Unis, is secretary general.

DR. GEORGE K. BURGESS, director Bureau of Standards

F. E. MOSKOVICS, president Improved Products Corporation

Four of the Directors of the American Standards Association

HOWARD COONLEY, president Walworth Co.

QUINCY BENT, vice-president Bethlehem Steel Co.

This Issue in Brief

Makes 46 per cent saving in fuel used in heat-treating by installing inspirators which regulate the gas-air ratio, to give either a reducing or oxidizing furnace atmosphere, regardless of the flow of gas.—Page 88.

* * *

Good design, not heat treatment, is the secret of successful spring manufacture, says maker. A spring made of annealed wire will support as much load as a heat-treated or cold-drawn spring, if elastic limit of the soft material is not exceeded. If springs have suitable hardness and still do not perform, the design should be changed rather than the hardness increased.—Page 84.

* * *

Low "customer turnover" is a major factor in earning adequate profits. Keeping customers satisfied with price, quality and delivery is the secret of low customer turnover, says successful manufacturer.—Page 82.

* * *

Mergers are no substitute for capable management, says Link-Belt president. As with small units, their earnings depend entirely on the sound judgment and foresight of the management.—Page 82.

* * *

Electrically welded pipe is made by first forming skelp into cylinders, which are moved by conveyors into electric welding machines. Conveyors at delivery end of machines pick up the pipe and carry it to milling machines, where the welding bead is removed for joint-coupling in the field.—Page 94.

* * *

Manufacturing losses and wastes can be reduced by making employees realize that their performance has a direct bearing on the marketability of the product. Employees should be considered as part of the sales force, and should be taught that their employer is simply the agent for securing customers for what they (the employees) produce.—Page 82.

Brittleness in hardened steel results from nitrogen content in the iron, says metallurgist. Hot blast and high-speed operation of the blast furnace increase nitrogen in the iron by the formation of cyanogen compounds in the furnace.—Page 85.

* * *

Harmful oxide content of iron is increased by transferring the molten metal from one vessel to another, due to oxidation of the metalloids in the iron. Average content of unreduced oxides in 61 samples of basic iron tested was 0.0272 per cent, but it may go as high as 0.15 to 0.20 per cent if the blast furnace is operating irregularly.—Page 82.

* * *

Predicts economic dislocation more severe than anything the world has yet seen. Every security market in the world is in hopelessly unsound condition, says economist. Colossal mass of inter-governmental obligations arising from the war compromises the situation. Obligations must be paid by export of goods on a tremendous scale.—Page 89.

* * *

"Lost art" of hardening copper is nothing but an interesting fable, says metallurgist. The ancients' secret was merely cold-working. The art has never been lost. Recent methods of hardening copper by alloying have come about as near to actual tempering as would seem possible.—Page 96.

* * *

Soundness of weld is automatically proved by hammer test. Electrically welded pipe is continuously hammered by a series of weights while pipe is under pressure in testing machine.—Page 94.

* * *

Pre-war status of European countries will return, says economist. World is ruled by steel and coal, and the New Europe in industrial, financial or military power will be balanced nationally much the same as Old Europe.—Page 90.

Cut your costs by giving foremen a practical knowledge of manufacturing economics. They should have a clear insight into such overhead items as depreciation, tool cost, scrap charges, supply costs, supervision and inspection charges and the like, says manufacturer.—Page 82.

* * *

Keeps customers satisfied by shipping repair parts the same day order is received. Order goes to stockroom as soon as it comes in. Stockroom makes up order at once, and it is trucked almost immediately to the shipping room, rather than waiting for a day's orders to accumulate.—Page 80.

* * *

Salvages gears with surface imperfections by lapping them. Soft metallic gears are usually mounted on an arbor between centers of a lapping machine having adjustments for varying the mesh of the gears. Hardened steel gears are usually mounted on a lathe and lapped on centers only.—Page 98.

* * *

Inspectors' fatigue reduced by making gages of aluminum. Roundness of welded pipe is tested with gages made of the light metal, with steel inserts for the gaging surface.—Page 94.

* * *

Physical effort put into each job is measured by gaging the calories expended in a minute by the operator. By changing the equipment and methods, as dictated by calory measurement, considerable gain in production per unit of labor-effort has been obtained.—Page 97.

* * *

Economy in transporting parts in small quantities from department to department has been obtained by using small skid boxes and tote pans, so designed that electric truck can carry a capacity load made up of a number of different parts. Trucks take three skids at one time, each skid containing a different kind of part.—Page 78.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

A Year's Great Gain in Steel

PRODUCTION of steel ingots in what may be called the steel year through June 30 was approximately 54,675,000 tons, or 25,000 tons more than the forecast made in THE IRON AGE of four weeks ago. That is a full 15 per cent in excess of production in any period of 12 months ending in any month prior to a year ago. There is a gain of 9 per cent over the calendar year 1928, but that year included one-half of the year now under review.

The steel year contains 311 working days. The year through last month was a day short, beginning and ending with a Sunday, while there had been an extra day in February, 1928. Transferring one day's production to make years of equal length and adding to the production reported monthly an allowance for electric and crucible ingots, production has been as follows:

Year through June 30:	Gross Tons
1925	39,450,000
1926	45,900,000
1927	46,800,000
1928	44,650,000
1929	54,675,000

In two years there is a gain of 7,875,000 tons, or nearly 17 per cent, which is phenomenal, being 8 per cent per annum, against an average annual gain of 2.6 per cent from 1920 to 1928, or an average of 3.4 per cent from 1913 to 1928.

And the steel industry is not done making records, for production is now running far above that of a year ago. Given a continuance of the rate of production in the last two months, production in the 12 months through July will be about 1,100,000 tons more than that in the 12 months through June, while August would make a further contribution of about the same amount. Production would have to slip next October to a rate 12 per cent under the recent rate to stop this making of new totals for 12 consecutive months, for output in the last two months has been about 195,275 tons per working day, while last year October, the high month, showed 172,221 tons per day. July of last year ran only 152,224 tons a day. Thus for an indeterminate time to come we shall be producing more steel than a year previous. Nothing like an enlightened guess can be made as to how long this making of new records for periods of 12 months will continue. As time passes the pace of a year previous will be harder to exceed; but the outlook for records is promising, since the present rate is about 6,000,000 tons a year above the actual production in the last 12 months.

Mr. Schwab spoke with eminent conservatism, even with restraint, in telling the American Iron and Steel Institute in his May address that "it is not inconceivable that the average annual production of steel ingots for the next 10-year period will exceed 50,000,000 tons." And then he added: "At this rate the consumption of raw materials will soon reach the staggering total of a quarter of a billion tons a year."

The Rate Shift in Cast Iron Pipe

ABOUT 40 years ago, the cast iron pipe industry, which once was so largely a Northern development that pipe made near Philadelphia was laid in the streets of Birmingham, began its exodus to Alabama. There it was favored by low-priced labor and pig iron and was granted special freight rates by the Southern railroads to foster its growth. With these advantages, the industry flourished in the South to such an extent that now 60 per cent of the total capacity is in Alabama and Tennessee. Today the Southern pipe trade is disturbed by the prospect of losing some of its predominance because of the recent decision of the Interstate Commerce Commission that existing freight rates are prejudicial to Northern foundries and "unduly preferential" to those in the South.

Although the cast iron pipe case was not linked up with the general rate investigation on iron and steel products, the decision is along the same lines; that is, a mileage scale is now the basis of the rate structure. When the revised tariffs are published by the railroads they will work out to the advantage of Northern foundries to the extent of about $2 a ton on shipments to many points in the Northern territory; furthermore, Northern foundries will be able to compete at points south of the Potomac River for the first time in many years.

Just what the ultimate effect will be on the cast iron pipe industry, particularly that portion of it in Alabama and Tennessee, remains to be seen. In recent years the differential in pig iron costs in favor of the Southern foundries has not been so marked as before the war, and labor efficiency in the North has been to some extent an offset to the higher scale of wages paid by Northern foundries.

SOME unusual uses for alloy steels are appearing, uses that are amply justified. Not so long ago it would have been regarded as uneconomical and at all events unnecessary to make shovels or common tools from anything but ordinary carbon steels. Today one American producer of various grades of hand shovels employs an alloy steel extensively, with the result of increasing the life of his product and hence the de-

mand for it. Another company has incorporated an alloy steel in mine picks and other tools with excellent results—a harder tool and one whose edges or points hold up longer and better. Alloy steels and heat treatment have been the remaking of the automobile industry, and their increasing application to lesser industries is highly promising even though much less spectacular.

Wage Assignment Law Tightened

MASSACHUSETTS has just passed a law designed to reduce abuses that have grown up under the statute governing the assignment of wages. An amendment provides that unless an assignment be formally accepted by the employer it shall not be legally binding. Hereafter, in every instance where an employee desires to assign his wages as security for purchase or loan or for other reason, he must have the consent of those who employ him. Responsibility is thus placed where, for the good of the average worker, it should rest. The new provision is a protection against too readily going into debt and against persons who would take advantage of an employee's weakness.

In Massachusetts until now, as under the laws of most of the States, there was no necessity that the employer have any knowledge of employee transactions involving wages yet to be earned. An assignment had to be recorded with the town clerk, but only rarely was publicity given to these records. The company got its first knowledge when a merchant or money-lender presented the assignment papers, leaving no alternative except it were the discharge of the assignor. If the account was for less than $300, 25 per cent of the contents of the pay envelope had to be held out; if for more, a much larger per cent. The usual practice has been, in the growing leniency of owners, to retain the man, but the incident has often been regarded as a black mark.

The change in the law should operate automatically to reduce the number of assignments of wages, apart from employers' refusals to accept them, since in a majority of cases an employee will hesitate to ask an acceptance unless his reason is a good one. The average worker is not apt to go to the office for this sort of help in buying a radio set or electric refrigerator or motor boat or automobile. In one case, however, a corporation actually advised this method of purchasing a second-hand car to be run between the shop and a home which a man had built with his own hands some miles in the country. The car was judged an economic necessity. But generally speaking the new Massachusetts law will make it easier to resist the constant temptations of the installment plan and the pressure of certain dealers who specialize in sales to improvident wage-earners.

A NEW record for six months' pig iron output in the United States was made in the first half of the year—at 21,621,363 gross tons—and now a calculation is in order of the probable 1929 production. In 1923, the record pig iron year, when 40,361,146 tons was made, the first half output was 21,016,475 tons. The falling off in the last half was 1,671,804 tons, or practically 8 per cent. Assuming the same percentage of decrease this year, the output for the last half would be 19,892,000 tons, bringing the year's total to 41,513,000 tons. Even should the decline in the rest of the year approximate 10 per cent, the total for the 12 months would be close to 41,100,000 tons. It seems reasonably assured that the 1929 pig iron output will reach a new high peak at not less than 41,000,000 tons, with a fair probability of attaining 41½ millions.

Swings in Our Trade Balance

OUR foreign trade showed a favorable balance of $119,122,000 in January and only $15,195,000 in April. The average business man takes an interest in our foreign trade, but is quite unable on account of the mass of detail to observe even approximately just where and why the changes occur. Sometimes he is even hazy as to the economic bearing of the general result, whether a large trade balance is to be considered favorable as likely to produce good conditions at home or is unfavorable as showing that selling conditions at home have not been good.

Monthly figures for last year chanced to line up in such a way that a relatively simple analysis can be made as to the points at which our foreign trade underwent a wide variation. The year's favorable merchandise trade balance was $1,036,912,000, which was the largest since 1921. Incidentally that must not be taken as an invidious comparison, for while 1921 was a very poor year with us there were some remains of an exceptional export movement, and our imports were much smaller than in subsequent years.

There was, however, nothing like a uniform trade balance during last year. The low month was April, at $18,614,000, and the high month November, at $218,347,000. It chances that April was also the low month in exports and November was very close to the high month in exports; hence exports only need be considered for a general study of this remarkable fluctuation. Total exports were $363,928,000 in April and $544,912,000 in November, the difference being $178,034,000, representing a 50 per cent increase.

Five-sixths of this increase in exports is found in three items. Textiles increased $103,785,000 or 155 per cent; vegetable food products and beverages, $29,515,000 or 103 per cent, and tobacco $13,999,000 or 125 per cent. Clearly this was largely or wholly a seasonal matter, November against April.

Various gains—in iron and steel, non-ferrous metals, machinery, petroleum, etc.—make up the remainder of the increase and offset certain decreases. There was no increase in automobiles, parts and accessories, but a decrease of $183,000, though in itself insignificant—less than 1 per cent.

Having observed the principal causes of last year's change from April to November, April of this year may now be considered in connection with the preceding April—its favorable merchandise balance of $15,195,000 comparing with $18,614,000 a year previous. There was an increase of $61,944,000 in exports but a slightly larger increase, $65,363,000, in imports.

In brief, we are doing a larger foreign trade this year than last, in both exports and imports, and by the precedent of last year we may expect our trade balance to increase by a seasonal swing.

CORRESPONDENCE

Germany's Reparations Problem as Her Steel Men View It

To the Editor: Your comments on page 1657 of your issue of June 13 on "Germany's Reparations Bill" have aroused much interest in the German steel industry.

As you know, the president of the United Steel Works, Doctor Vogler, was one of the two German experts in Paris, but he refused to sign his name to the Young scheme. I have been requested on behalf of the Federation of German iron and steel producers to make a short reply to your statement, thinking that the opinions here expressed may interest you, inasmuch as the Young scheme will certainly have its economic influence upon Germany's industrial expansion in the years just ahead.

Before the war (exactly, on Aug. 1, 1914) the aggregate bank savings of the German population were 21 milliards (billions) of marks. This year (June 1) they were 7½ milliards. The national wealth of Germany at the end of 1928 was estimated to be 62 per cent of the wealth in 1913. When estimating the German payments it must not be forgotten that, apart from the two billion marks to be paid annually in accordance with the Young scheme, Germany has other war debts (internal debts, also those to neutral European powers, etc.), which, according to the recent publication in the Reichstag, are close to 1.9 billions annually, bringing the total payments on war debts to 4 milliards annually.

Among steel industrialists it is believed this amount could be paid, considering that taxation is now three times higher than in 1914, and in spite of the loss of Alsace-Lorraine, Upper Silesia, large eastern and western Prussian territories and North Schleswig. But 2 billions of marks annually have to be paid in foreign money, not in marks, and this is the whole problem in a nutshell. Germany has lost all her colonies, has lost all the loans to foreign countries, almost all the property invested abroad (sequestrated during the war). Besides this she has to pay the French and British armies in the Rhineland in foreign money; about 5 milliards to Belgium (marks spent there during the occupation); has to pay interest on foreign loans, etc.

The German Reichsbank published last month details of the adverse trade balance of Germany. Last year the visible and invisible imports (interest on loans, etc.) exceeded by 3¾ billion marks the visible and invisible exports. This huge balance has been covered by capital influx. Since 1924 Germany has borrowed approximately 19 billion marks abroad and has loaned ½ billion to foreign countries. So interest is rapidly accumulating (more than 1¼ billions annually already) and, in the opinion of men in the German steel industry, this capital import will not keep up very long. You know that the British experts have themselves said that all the payments made by the German Government since 1924 were from money borrowed in the United States, England and elsewhere. Germany could pay the 2 milliards, if her visible and invisible exports (I refer to the Dawes plan, which was built upon this suggestion) should exceed the visible and invisible imports. Since this is not the fact, Germany will be able to pay as long as the United States and the other countries are investing money in Germany and not one day longer.

A remedy is to be found in the giving back of the colonies, and the granting of access to the allied countries for German industrial products, etc., so that the trade balance might be changed. But there is nowhere any thought of returning the colonies, and as the customs walls are raised from year to year, there seems to be no way out of this problem.

The reparations solution is not a question of how much Germany can pay (and it is believed that the 2 milliards annually can be paid), but *how* she can pay it, since the deliveries of merchandise on reparations account also are to be stopped. If Germany pays, it has to be in dollars, pounds, francs, etc., and this money she can get only from a very heavy surplus of exports over imports, plus interest on nearly 20 milliards of foreign money, etc. This at the present moment is impossible.

PAUL FIDRMUC.

Hamburg, Germany, June 24.

Alloy Steels, Past and Future

To the Editor: My attention has just been called to an article in THE IRON AGE, May 16, page 1339, by W. J. Priestly, on the use of alloy steel, showing what great strides have been possible in recent years due to the use of this material in engineering structures.

The writer firmly believes that in works of considerable magnitude the use of alloy steels will make possible, in the next few years, very great changes in design and construction methods. Looking at the past, however, Mr. Priestly has made a misleading statement with regard to the use of alloy steel in aircraft. Ten years ago last month, namely June 14, the Atlantic was crossed in a British Vickers plane, piloted by Alcock and Brown, in the record time of 16 hr. and 12 min. It is true that for the next eight years no further direct crossing was made, but the fact remains that this feat was performed and the machine stood up to it.

It is well known that alloy steel was extensively used in Rolls-Royce engines and has been in fairly general use for high-grade engines much longer than the ten years mentioned in the article in question.

ROBERT W. A. BREWER,
Consulting Engineer.

Jenkintown, Pa.

Classification of Sponge Iron in the Tariff

To the Editor: In THE IRON AGE for July 4, page 29, your Washington correspondent reports, from the Senate hearings on the tariff, the writer's statement as a witness on sponge iron classification that the "old rate" was 30 per cent. The records of the hearings show that this report is not correct. The statement was that the old rate was the same as for pig iron, or $1.125 per gross ton.

The first imports of sponge iron occurred during 1926. The material continued to be imported during 1927 and 1928, mainly through the ports of New York and Philadelphia. From the beginning, and continuously since, the appraisers at these two ports classified the material with pig iron. Their classification and understanding of the material was logical and no protest was ever filed against their decision.

The first shipment ever taken in at Baltimore, however, was assessed according to paragraph 214, which covers earthy or mineral substances, etc., and provides a duty of 30 per cent ad valorem. Through a ruling by the customs authorities in Washington on Feb. 27, just before the change in administration, the Baltimore decision was upheld without a hearing, and is now duly protested. To anyone familiar with sponge iron, which, of course, is a metal and must be considered under the metal schedule, the ruling does not seem to have any foundation, and it is hoped it will be rectified in the customs courts.

The writer's protest in Washington was thus in no way a demand for the lowering of any duty rate, but was rather a plea that the classification of sponge iron should be continued under a paragraph at least not higher than paragraph 301, covering pig iron and scrap.

In view of the fact that no sponge iron is produced

at the present time in the United States, and that there is no prospect of its being produced for sale to the general steel trade at all for some time, the lowest possible duty would seem desirable to domestic interests. The steel industry has agreed that this is the case and the writer's testimony and application for the retention of a duty not higher than pig iron has been supported by the majority of the makers of high-grade steel.

Anyone familiar with the raw materials used in present-day steel making will realize that there is no competition between sponge iron and any other material regularly used. It seems entirely out of line to compare sponge iron with muck bars instead of with pig iron when considering the proper classification of the material. Both pig iron and sponge iron are initial products from the reduction of iron ore, but muck bars, as well as any other material mentioned in paragraph 303, are manufactured products—manufactured from pig iron or from sponge iron.

N. K. G. THOLAND,
Ekstrand & Tholand.

New York, July 6.

Casting Steel in a Water-Cooled Copper Ingot-Mold

ALTHOUGH the process of casting metals in water-cooled molds is not new, it has a number of advantages over the usual procedure and was therefore subjected to a careful experimental study by W. Oertel, who describes his results in *Stahl und Eisen*, May 9, 1929. An abstract follows:

The mold used contained 200 kg. (440 lb.) of steel and consisted of a copper tube 200 mm. (about 7.9 in.) inside diameter, 20 mm. wall thickness, and 1000 mm. in length. This was surrounded by a cast iron jacket which allowed an annular water space about 700 mm. wide (about 2.75 in.).

In casting, the steel solidifies very rapidly, so that in a few minutes the ingot may be removed from the mold. A small pipe occurs well up toward the upper surface of the ingot. Additional advantage over the uncooled mold arises from the excellent surface and the absence of segregation in ingots made in the copper mold.

In respect to crystalline structure of the ingot—the water-cooled mold offers definite advantages in that the grain-size is smaller througout than with the usual casting practice.

A number of heats of various grades were made in a small Heroult furnace. Each was cast in the water-cooled mold and in an ordinary mold. Comparison of the physical properties of the two ingots revealed practically no difference. If there is any, it is probably in the greater uniformity of the properties of the quickly-cooled ingot.

From an operating standpoint the following advantages may be cited:

The reduction in the cooling time of the mold.

Longer mold life, since cracking or cutting the surface does not take place.

Greater rolling mill yield due to the location of the pipe at the extreme top of the ingot, even without the use of a hot-top.

Excellent surface of the ingot, enabling it to be rolled without any preparation.

Improvements in Tool Steel

To indicate that progress in tool steel manufacture is still being rapidly made, H. E. Kershaw, chief research chemist of Edgar Allen & Co., Ltd., Sheffield, England, writing in *Edgar Allen News*, gives some figures on the proper speed of standard cut. A quotation from Harbord's "Metallurgy of Steel" shows the developments up to 1910:

Original high-carbon tool steels.....	16 ft. a minute
Mushet's self-hardening steel.....	26 ft. a minute
Taylor and White's high-speed steel....	60 ft. a minute
Modern high-speed steel.....	100 ft. a minute

Further advance that has been made up to the present is shown by tests on four different qualities of high-speed steel, carried out under identical conditions. The tools were all of the same size. The cutting speed was the same, the depth of cut and the traverse, and therefore the amount of metal removed per minute was the same. The tools were put to work on the same bar, which was of uniform hardness throughout.

The 14 per cent tungsten high-speed steel stood up for 4 min. 30 sec. The 18-per cent tungsten high-speed steel stood up for 8 min. 12 sec. The super-high-speed steel stood up for 14 min. 6 sec., and the very latest development in super-high-speed steels stood up for 23 min.

"The 14-per cent tungsten steel was a revelation when it was first introduced, and now there are steels on the market five times as efficient," concludes Mr. Kershaw.

Automatic Continuous Manufacturing

Simultation, a word coined by Edward Payson Blanchard, of the Bullard Co., Bridgeport, Conn., to define the ultimate in the use of machinery for manufacturing, is the theme of a discussion of the philosophy of production which Mr. Blanchard recently contributed to the *Financial Survey*, of Hartford. The principle, which comprehends a completely automatic continuous process, without hand work or man power, is calculated to bring, he says, the 4-hr. work period. It is the step beyond mass production, which itself has raised the issue of the 6-hr. shift, and it multiplies the problems of added leisure, though at the same time encouraging the scattering of homes and the maintenance of a high standard of living. In the nature of the case the article is speculative rather than prophetic.

The author is sure that job shops will still be essential and that the all-around mechanic, who prefers diversified jobs, will find his opportunity there. Also, says he, the industry which builds the complete automatic machinery for production will never be run on such a scale as that machinery is itself used. Further, there will always be a market among those people who are willing to pay an extra cost for distinction from the common mob of standardization; "there will always exist a birthright in originality."

Effect of Cold Work on Corrosion of Steel

To find out the effect of cold work on the liability of iron and steel to corrosion, a Japanese investigator, Hikozo Endo, has made an investigation. The specimens were subjected to strains different both in amount and kind (tension, torsion, compression and impact), and were subsequently submitted to the action of a 1 per cent sulphuric acid solution, the weight loss of each specimen being measured after the lapse of 72 hr.

From the results obtained, the investigator concludes that, if the stress is so large as to give rise to a permanent deformation of the specimen, its effect, consisting in the promotion of the corrosion of the latter, begins to appear, the degree of corrosion varying with the amount of deformation.

Iron and Steel Markets

Summer Steel Pace to Be High

Heavy July Operations Follow Record-Breaking Ingot Output of 28,967,174 Tons in First Half and Large June Total of 4,881,370 Tons

FRESH accumulations of steel orders and specifications since the opening of the third quarter give renewed assurance that the steel industry will operate through July and possibly even August at close to maximum capacity.

Though the pace of steel buying has slackened in some districts, Chicago sales were the largest for any week this year. Heavy releases were also received by Pittsburgh mills.

Coming on top of a record half year which exceeded the largest previous six months' ingot output by almost 4,000,000 tons, the vitality of current demand is the more surprising. No evidence of the usual midsummer letdown is in sight.

July output probably will not fall far short of the large June total of 4,881,370 tons, which was at a rate only fractionally below 100 per cent of capacity. The holiday, heat and special repair shutdowns are primary checks at the moment to continued high performance.

Last month's unexpectedly large total brought the aggregate for six months to 28,967,174 tons, which surpassed that of the same period in 1928 by 4,169,101 tons and the previous all-time six months' record of 25,067,122 tons in the last half of 1928 by 3,900,052 tons. The output of each of the past four months has been larger than any monthly total ever before achieved. For the full year to July 1, the ingot output was 54,034,296 tons.

Backlogs of some products are being reduced, with the result that earlier deliveries are possible, particularly on hot-rolled and cold-finished bars, structural shapes and strip steel. In plates and sheets, however, mills have orders that will carry them through the summer without important additions.

Over the midsummer inventory period, many consumers have permitted their steel stocks to run low, and the volume of specifications received so far in July indicates that most buyers are now fairly certain that their summer needs will not be appreciably lower than in the second quarter.

The slowing down in the demand for steel from the automobile industry probably will be less than summer usually brings. Some parts manufacturers have again speeded up schedules to meet the calls from motor car makers preparing to bring out new models. Previous records for July and August are expected to be broken because of the continued high operations of the two leading makers of low-priced cars.

June automobile production, at 536,309 units, broke all records for that month and made a half year's total of 3,380,088 motor vehicles of all types, exceeding the output in the first half of 1928 by 1,053,579 units.

Railroad inquiry for steel is noteworthy. Supplementary rail inquiries include 30,000 tons for the Great Northern and 5000 tons for other Northwestern roads. The Canadian Pacific has placed a large rail order with the Algoma mill. Bridges in New Jersey for the Pennsylvania will take 14,000 tons of shapes, and the Lackawanna Railroad has ordered 4000 tons for catenary supports as a beginning of its electrification program. The Wabash has bought a car ferry requiring 2500 tons. Meanwhile, car builders are taking steel heavily to complete recent car orders. Upward of 30,000 tons will be ordered for 4000 car bodies recently placed by the Pennsylvania. New railroad equipment buying is light.

Several large gas line projects are taking shape. A line from the Panhandle of Texas to Chicago, also one from the Southwest to Nebraska and Iowa and others which are less definite promise heavy tonnages of pipe. The Texas-Chicago line has the backing of important oil interests.

Structural steel activity is such that a leading producer expects the third quarter to rival the second in volume. The week's total of new projects, at 49,000 tons, is the largest reported since the first week of June, while lettings were 45,000 tons. Awards of buildings only in the New York metropolitan district in the first half of the year took 243,285 tons of steel against 182,800 tons in the same period last year, a gain of 33 per cent.

Southern pig iron presents the only marked sign of weakness in the whole iron and steel situation. A reduction of 50c. a ton, the second of that amount within a few weeks, has been made by the Alabama producers in an effort to move large stocks of iron, the accumulation of which has been due in part to the subnormal consumption by Southern cast iron pipe foundries. Price weakness has also developed on pig iron sales in New England, and moderate concessions in the Pittsburgh district have resulted from the extremely competitive situation existing there now. Pig iron buying is not in large volume.

Steel prices are fairly steady, though minor weakness has occurred in some districts on wire nails and black and galvanized sheets, while at Cleveland steel bars have dropped $1 a ton to 1.90c. a lb.

Heavy melting steel scrap has advanced 25c. a ton at Pittsburgh, and signs there and elsewhere point to a definite turn upward.

THE IRON AGE composite price for pig iron has declined to $18.54 from $18.63 last week. This is the second drop in five weeks from the year's high of $18.71. The finished steel composite price is unchanged at 2.412c.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	July 9, 1929	July 2, 1929	June 11, 1929	July 10, 1928
No. 2 fdy., Philadelphia	$21.76	$21.76	$21.76	$20.26
No. 2, Valley furnace	18.50	18.50	18.50	16.75
No. 2 Southern, Cin'ti	*18.19*	18.69	18.69	19.19
No. 2, Birmingham	*14.50*	15.00	15.00	15.50
No. 2 foundry, Chicago*	20.00	20.00	20.00	17.50
Basic, del'd eastern Pa.	20.25	20.25	20.25	19.00
Basic, Valley furnace	18.50	18.50	18.50	16.00
Valley Bessemer, del'd P'gh.	20.76	20.76	20.76	18.76
Malleable, Chicago*	20.00	20.00	20.00	17.50
Malleable, Valley	19.00	19.00	19.00	17.00
Gray forge, Pittsburgh	19.76	19.76	19.76	18.01
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	36.00	32.00
Sheet bars, Pittsburgh	35.00	35.00	36.00	32.00
Slabs, Pittsburgh	35.00	35.00	36.00	32.00
Forging billets, Pittsburgh	40.00	40.00	41.00	38.00
Wire rods, Pittsburgh	42.00	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.85
Finished Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.95	1.95	1.95	1.85
Bars, Chicago	2.05	2.05	2.05	2.00
Bars, Cleveland	1.95	1.95	1.95	1.85
Bars, New York	2.29	2.29	2.29	2.19
Tank plates, Pittsburgh	1.95	1.95	1.95	1.85
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	2.22½	2.22½	2.22½	2.17½
Structural shapes, Pittsburgh	1.95	1.95	1.95	1.85
Structural shapes, Chicago	2.05	2.05	2.05	2.00
Structural shapes, New York	2.19½	2.19½	2.19½	2.14½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.10
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.75
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	3.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel, *Per Lb. to Large Buyers:*	July 9, 1929 Cents	July 2, 1929 Cents	June 11, 1929 Cents	July 10, 1928 Cents
Sheets, black, No. 24, P'gh	2.85	2.85	2.85	2.65
Sheets, black, No. 24, Chicago dist. mill	3.05	3.05	3.05	2.75
Sheets, galv., No. 24, P'gh	3.60	3.60	3.60	3.50
Sheets, galv., No. 24, Chicago dist. mill	3.80	3.80	3.80	3.60
Sheets, blue, No. 13, P'gh	2.35	2.35	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	2.65	2.65	2.65	2.55
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.60
Plain wire, Pittsburgh	2.50	2.50	2.50	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.45
Barbed wire, galv., P'gh	3.30	3.30	3.30	3.20
Barbed wire, galv., Chicago dist. mill	3.35	3.35	3.35	3.25
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$18.50	$18.25	$18.25	$14.00
Heavy melting steel, Phila	16.50	16.50	16.00	13.00
Heavy melting steel, Ch'go	14.75	14.75	15.00	12.25
Carwheels, Chicago	14.00	14.00	14.25	12.75
Carwheels, Philadelphia	16.50	16.00	16.00	15.50
No. 1 cast, Pittsburgh	15.50	15.50	15.50	14.25
No. 1 cast, Philadelphia	16.50	16.50	16.50	15.50
No. 1 cast, Ch'go (net ton)	14.50	14.50	15.00	13.50
No. 1 RR. wrot., Phila	16.00	16.00	16.00	13.50
No. 1 RR. wrot., Ch'go (net)	13.50	13.50	13.50	11.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$2.60
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	14.75
Electrolytic copper, refinery	17.75	17.75	17.75	14.50
Tin (Straits), New York	45.12½	44.62½	44.50	46.25
Zinc, East St. Louis	6.70	6.70	6.65	6.20
Zinc, New York	7.05	7.05	7.00	6.55
Lead, St. Louis	6.70	6.80	6.80	6.10
Lead, New York	6.90	7.00	7.00	6.20
Antimony (Asiatic), N. Y.	8.50	8.75	9.00	9.62½

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Operations Continue at Same High Rate and Deliveries Are Easing—Consumer Stocks Abnormally Low

PITTSBURGH, July 9.—Following a rather marked interruption last week occasioned by the holiday, steel operations in this district have been resumed again at about the same high rate which has prevailed for some time. But production is now somewhat heavier than current specifications warrant on most products, and, with the exception of sheets and plates, backlogs are being considerably reduced. Deliveries can now be made in two or three weeks or better on cold-finished bars, strip steel, merchant bars and shapes, and, although current demand is sufficient to assure better than usual summer operations, mills are having little trouble making shipments.

Consumer stocks of all forms of finished steel are abnormally low and the somewhat heavier specifications during the last few days indicate that users who have been slow to order out their July tonnage are now more certain of satisfactory business during the present month and early August.

The leading producer of automobiles in the low-priced field plans a record production during July, and the other maker of cars in this field is curtailing very little. The other automobile companies present a rather mixed picture, and their contracting operations are influencing the order books of makers of strip steel, cold-finished bars and even sheets. Under these conditions it is difficult to get a line on the market which might have a general application.

Makers of lap-welded tubing are in a comfortable position on account of recent large line-pipe orders, and a gas line extending from the Texas Panhandle to Chicago has been added to prospective business. Demand for standard pipe has failed to develop according to expectations.

Mills in this district have benefited from recent rail orders and railroad car builders are taking material at an undiminished rate. Structural shapes are not so active and operations of local fabricating shops are unsteady. On the other hand, barge builders are probably busier than they have ever been and business already on company books assures high activity for several months. Reinforcing bars are also active, although specifications on merchant bars have declined considerably in the last two or three weeks.

Prices are showing weakness on some products, but the larger mills are adhering rather firmly to recent quotations. Concessions of $2 a ton from the recent minimum on galvanized sheets are still reported, but are hardly representative of the general market. Wire nails are also weak in competitive districts, but this condition has persisted for a long time in the face of dull demand. Prices on semi-finished steel are still rather uncertain, with little buying of consequence.

Pig iron inquiry is more active. Concessions from recent market prices on foundry and basic iron have appeared in a few recent transactions, but the market is not quotably lower. Scrap is slightly stronger and seems to be definitely turning upward following several weeks of little fluctuation.

Semi-Finished Steel. — Unfinished steel is gradually becoming more plen-

tiful in this and nearby districts, and, for the first time in two or three months, sheet mills are being operated with a full supply of bars. A number of open-hearth furnaces in the district were down for repairs for the greater part of last week, advantage having been taken of the mid-week holiday interruption to get equipment in condition for heavy summer business. The price situation shows little change, with sellers apparently holding firm to a $35 quotation on billets, slabs and sheet bars and $40 on forging billets, while a few makers who have small tonnages for sale only occasionally are asking prices $1 a ton higher. Buying is confined to small lots, and large users in the territory have not yet covered their third quarter needs. Some of these users placed orders two or three months ago with two or more sources of supply in order to assure certain coverage of their needs, and, as some of this material is still to be shipped, they may not be forced to buy again for several weeks. This puts them in a position to resist higher asking prices at this time and prevents the market from becoming definitely established at either the asking or offering price. Wire rods are still fairly active, but demand for skelp is moderate.

Pig Iron.—Buyers are beginning to show more interest in their third quarter requirements and, while specific inquiries are not yet numerous, consumers are quietly sounding out the market. Shipments against second quarter contracts have not been completed in many cases and a few of the larger buyers may not have to cover their needs for two or three weeks. The leading merchant interest in this district reports very satisfactory business and shipments against contracts that are somewhat above the average for this time of the year. Considerable price competition is said to have developed in the recent purchase of 5000 tons of foundry iron by the Columbia Radiator Co., McKeesport, Pa. However, Valley interests which met the price of local and nearby furnaces did not get the business. The Westinghouse Electric & Mfg. Co. has not yet closed for the second-half requirements of its Trafford City, Pa., works, and the Pittsburgh Plate Glass Co. is inquiring for 400 tons of malleable iron for Ford City, Pa. An unnamed consumer is inquiring for 1800 tons of malleable iron. Other inquiries are said to be before the trade, and a large part of the current buying is being done quietly. Nevertheless it seems rather certain that considerably less than 50 per cent of the tonnage to be bought in this district for third quarter has been closed. Small lots of Bessemer iron are being taken regularly at $19, Valley, and this price is also holding well on malleable. The $18.50, Valley, and $19, Pittsburgh, local furnace prices on foundry and basic have been shaded in instances where competition was keen. However, the market is still quotable at those figures.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Bars, Shapes and Plates.—The new quarter has started out satisfactorily, considering the mid-week holiday, and some companies report unusually heavy specification to start off the new week. With no advance in price this quarter, there was no rush to place orders at the end of the last month, and the lull in business which occasionally occurs at the beginning of a new quarter seems to be missing this month. The plate business is still somewhat better than that in bars and shapes, but a heavier-than-usual movement of concrete reinforcing steel is adding considerable tonnage to bar shipments. Shapes are not so active, and, although a fair amount of business was added to fabricating shop schedules during June, operations are spotty, with occasional brief periods of practically no engagement. The heavy movement of plates is due partially to the large requirements of barge yards and railroad equipment builders. The former now have more than enough business to keep them well engaged for the entire quarter, and early reports indicate that a large number of barges will be placed in the fall for spring delivery. The high activity among barge builders this year, with consequent extended deliveries, is teaching buyers to anticipate their needs, and future business in this line is expected to be of a steadier nature. The plate price is very firm at 1.95c., Pittsburgh, and shading of bars and shapes is seldom reported in this district.

Wire Products.—Mills report another week of rather heavy specifications, but some makers report a decline in shipments of manufacturers' wire. However, the decline in automobile production seems to have had less effect on the movement of this product than in other cases, and business is considerably better than usual at this time of the year. Demand for fencing and barbed wire is declining, but warehouse stocks are not heavy and considerable consumer buying which was put off in the spring on account of unfavorable weather is expected to come out in the fall. The nail market continues to be dull, but prices on both wire and nails are holding satisfactorily in this immediate district.

Tubular Goods.—Several Western oil companies are interested in a contemplated gas line to extend from the Panhandle district of Texas into Chicago. Plans are still in the formative stage and considerable time will be required to complete investigations of the supply and probable consumption of gas before the pipe requirements of the project will be known. Plans are said to be under consideration for other large line-pipe projects, and the outlook for this type of work is growing more promising. Mills making lap-welded and seamless tubing in large sizes are fairly well engaged at present, and the third quarter is expected to be a better one from the standpoint of operations than its predecessor. Oil country demand could hardly be called active, but has

The Iron Age Composite Prices

Finished Steel

July 9, 1929, 2.412c. a Lb.

One week ago	2.412c.
One month ago	2.412c.
One year ago	2.326c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1929	2.412c.,	April 2;	2.391c.,	Jan. 8
1928	2.391c.,	Dec. 11;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18

Pig Iron

July 9, 1929, $18.54 a Gross Ton

One week ago	$18.63
One month ago	18.63
One year ago	17.09
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1929	$18.71,	May 14;	$18.29,	March 19
1928	18.59,	Nov. 27;	17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
Del'd Philadelphia	2.27c.
Del'd New York	2.29c.
Del'd Cleveland	1.92½c. to 2.00c.
F.o.b. Cleveland	1.90c. to 1.95c.
F.o.b. Lackawanna	2.05c.
F.o.b. Birmingham	2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.15c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c. to 1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.05c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.15c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.15c.
F.o.b. Coatesville	2.05c.
F.o.b. Sparrow Point	2.05c.
F.o.b. Lackawanna	2.05c.
Del'd New York	2.22½c.
C.i.f. Pacific ports	2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.15c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.01c. to 2.06c.
Del'd New York	2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.35c.
Shafting, ground, f.o.b. mill	*2.65c. to 3.60c.
Strips, P'gh	2.75c. to 2.85c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c. to 4.35c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.65 to $2.75
Galvanized nails	4.65 to 4.75
Galvanized staples	3.35 to 3.45
Polished staples	3.10 to 3.20
Cement coated nails	2.65 to 2.75
	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.50 to $2.60
Annealed fence wire	2.65 to 2.75
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.10 to 3.20
Barbed wire, galv'd	3.30 to 3.40
Barbed wire, painted	3.05 to 3.15
Woven wire fence (per net ton to retailers)	65.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh	2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.35c.
No. 13, f.o.b. Chicago dist.	2.45c.
No. 13, del'd Philadelphia	2.67c.
No. 13, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.85c. to 2.95c.
No. 24, f.o.b. Chicago dist. mill	3.05c.
No. 24, del'd Philadelphia	3.17c. to 3.27c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c. to 4.20c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.70c.
No. 24, f.o.b. Chicago dist. mill	3.80c.
No. 24, del'd Cleveland	3.79c. to 3.89c.
No. 24, del'd Philadelphia	3.92c. to 4.02c.
No. 24, f.o.b. Birmingham	3.75c. to 3.85c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 28, f.o.b. Pittsburgh	4.10c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.00c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(½% Nickel)	0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is ¾c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. carry the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅞ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	⅛ and ¼	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47½	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on block by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	40	1½ in.	1
2½ in.—2¾ in.	48	1¾ in.	8
3 in.	54	2 in.—2¼ in.	13
3¼ in.—3¾ in.	56	2½ in.—2¾ in.	16
4 in.	59	3 in.	17
4½ in. to 6 in.	48	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2¼ in.	34	4½, 5 and 6 in.	42
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ to 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb. base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

shown some improvement in the last few weeks. Shipments of mechanical tubing are declining slightly.

Sheets.—Production was curtailed sharply last week on account of the holiday, with only a few mills operating more than nine turns. Specifications held up fairly well and tonnage releases thus far in the present week have been heavy. Operations this week will also be at close to capacity, as the shortage of crude steel has now ceased to be an important factor. Nevertheless, hot weather is becoming a hindrance in production and mills are very anxious to catch up on shipments before more serious curtailment results. Deliveries on blue annealed sheets and light plates still average about six weeks, while on black and galvanized four weeks is not uncommon. Automobile production during July is expected to hold at about the present level, as the sheet requirements of the leading producers show little or no decrease in aggregate tonnage. Prices are unchanged, with galvanized sheets showing the only pronounced weakness.

Tin Plates.—Conditions in this market have shown some improvement in the last two weeks. Specifications are not noticeably heavier, but crop conditions are reported favorable, and, following a more or less general suspension of operations during the last days of the past week, production this week is expected to be at about 95 per cent of capacity.

Old Material.—After several weeks of comparative price stability, the scrap market seems to be turning definitely upward, and although advances are still rather difficult to place definitely, No. 1 heavy melting steel may now be quoted at $18.25 to $18.75, in the absence of large consumer purchases. This advance might be considered only nominal, but good scrap is less plentiful than ever and dealers are having more difficulty in buying against old orders. It is reasonably certain that no dealer would be willing to sell today for less than $18.25, and a large tonnage of railroad steel, or its equivalent, would bring more than $19. As stated last week, the Pennsylvania Railroad list brought over $19, and the trade believes the Baltimore & Ohio and Norfolk & Western lists, which close this week, will also bring high figures. The latter list, which will close on July 11, contains about 4500 tons of steel. Hydraulic compressed sheets are still quotable at $18 to $18.50, and No. 2 heavy melting steel has been sold at as high as $16.50. Specialties are very scarce and dealers are having considerable difficulty in buying against old orders for less than $21.50 on knuckles and couplers or rolled steel wheels. Machine shop turnings have been sold again at $12 and the blast furnace grades have advanced 25c. to a $12.50 top.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$18.25 to $18.75
No. 2 heavy melting steel	16.00 to 16.50
Scrap rails	17.50 to 18.00
Compressed sheet steel	18.00 to 18.50
Bundled sheets, sides and ends	16.50 to 17.00
Cast iron carwheels	16.00 to 16.50
Sheet bar crops, ordinary	18.50 to 19.00
Heavy breakable cast	12.50 to 13.00
No. 2 railroad wrought	18.25 to 18.75
Hvy. steel axle turnings	16.00 to 16.50
Machine shop turnings	11.50 to 12.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	21.50 to 22.00
Railr. coil and leaf springs	21.50 to 22.00
Rolled steel wheels	21.50 to 22.00
Low phos. billet and bloom ends	22.00 to 22.50
Low phos., mill plates	22.00 to 22.50
Low phos., light grades	20.00 to 20.50
Low phos., sheet bar crops	20.00 to 21.00
Heavy steel axle turnings	16.00 to 16.50
Electric Furnace Grades:	
Low phos., punchings	19.50 to 20.50
Hvy. steel axle turnings	16.00 to 16.50
Blast Furnace Grades:	
Short shoveling steel turnings	12.00 to 12.50
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
Cupola Grades:	
No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	20.00 to 21.00

Strip Steel.—No pronounced decline in strip steel specifications is reported, and business seems fairly well established at the levels which have prevailed for several weeks. Reports lack consistency, as some mills are considerably behind in their deliveries on the wider sizes of hot-rolled strip while operating on a hand-to-mouth basis on the narrower materials, and others report an almost opposite situation. This indicates a rather poorly diversified demand, with business largely dependent on the fluctuating requirements of large users. Cold-rolled strip is steadier, with deliveries generally averaging from two to three weeks. On the hot-rolled material prices are holding at 1.90c. and 2c., Pittsburgh, while occasional concessions from the 2.75c. to 2.85c. range on cold-rolled strip are reported.

Coal and Coke.—The coke market continues quiet, with the furnace grade holding at $2.75 to $2.85, Connellsville, and production by independent companies well adjusted to current demand. On the foundry grade shipments are near the low point of the year and prices have little strength. The premium brands are firm at $4.85, ovens. Coal prices have gained little strength, but production is holding up well for this time of the year and industrial consumption is large.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets	3.45c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd, base per 100 lb.	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Symington and National Malleable to Merge

Plans are under way for merger of Symington Co., Rochester, N. Y., manufacturer of railroad equipment, and National Malleable & Steel Castings Co., Cleveland, producer of iron and steel castings for railroad and other service. Consolidation will include Gould Coupler Co., Depew, N. Y., subsidiary of Symington Co., manufacturer of equipment for locomotives, passenger and freight cars, as well as its affiliated organization, Gould Storage Battery Co. The new organization will carry out expansion program for increased production. Present plants will be continued. These include iron foundries of National Malleable Company at Cleveland, Chicago, Indianapolis, Toledo and East St. Louis, Ill., and steel foundries at Sharon, Pa., Chicago and Melrose Park, Ill. Henry F. Pope is president of the National Malleable Company.

Shanghai Tungsten Exports to United States Double

Exports of tungsten ore from Shanghai to the United States in 1928 were more than twice the shipments in 1927, according to a report from Consul J. C. Huston, Shanghai, made public by the Department of Commerce. Reliable information is to the effect that existing contracts cover all stocks of tungsten ore now on hand in Shanghai.

It is reported that there are on hand at Kanchow, Kiangsi Province, near the tungsten deposits, stocks of tungsten concentrates variously estimated at between 600 and 1000 tons, of which 300 tons are contracted-for cargo, and the present asking price for the uncontracted balance is $7 per unit for September-October shipment from Shanghai. It is impossible to transport any of this stock to Shanghai for the time being, owing to the fact that the canals connecting the south of Kiangsi Province with the Yangtsze River are too shallow, due to lack of rains.

Declared exports of tungsten ore from Shanghai to the United States during the first quarter of 1929 amounted to 1,423,877 lb. valued at $187,867. There were no such shipments during the first quarter of 1928, owing to expectation of New York importers that the import duty on tungsten ore in the United States would be raised.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4 in. and under 10 in., Pittsburgh	$35.00
Rerolling, 4 in. and under 10 in., Youngstown	35.00
Rerolling, 4 in. and under 10 in., Cleveland	35.00
Rerolling, 4 in. and under 10 in., Chicago	37.00
Forging quality, Pittsburgh	$40.00 to 41.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	10.00c.
Iron ore, low phos., Swedish, average 68% iron	10.00c.
Iron ore, basis Swedish, average 65% iron	9.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	33.00c. to 35.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	33.00c. to 35.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$15.00 to $15.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.75 to $2.85
Foundry, f.o.b. Connellsville prompt	3.75 to 4.85
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

Per Gross Ton Furnace		Per Gross Ton Furnace	
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio Furnace

Per Gross Ton		Per Gross Ton	
10%	$31.00	12%	$35.00
11%	33.00		

Silvery Iron

F.o.b. Jackson County, Ohio Furnace

Per Gross Ton		Per Gross Ton	
6%	$24.00	10%	$29.00
7%	25.00	11%	31.00
8%	26.00	12%	33.00
9%	27.00		

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.00 to $18.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	70
Semi-finished hexagons castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(½-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Heavy Buying of Steel Features Opening of Third Quarter —Mill Backlogs Again Increase

CHICAGO, July 9.—Sales of finished steel in the past week were larger than in any like period so far this year. A liberal number of users are closing for third quarter requirements, and in addition there have been sizable tonnages of plates placed for pipe construction. New orders for bars bulk large, and it is noteworthy that some of this business is coming from automobile parts manufacturers as they swing into larger production to meet the needs of automobile makers who are about to introduce new models.

As sales mount, specifications remain steady, being fully equal to shipments and affording mill output at capacity. Non-integrated mills, though still pressed for supplies of raw steel, are having less difficulty in picking up odd lots, though often at some distance from their plants. Producers of semi-finished steel find apportionment among finishing departments less pressing and as a result some finishing units, such as hot mills, are less restricted as to rate of output and are operating nearer rated capacity.

Heavier buying of steel is placing backlogs on a more substantial basis than they have been in a number of weeks. Users' willingness to make commitments is on a par with the attitude taken at the opening of the second quarter—a situation not usually expected at this time of the year when a midsummer lull is normally experienced.

Prices for all commodities, with the exception of nails, remain steady. Plates, shapes and bars are firm at 2.05c. a lb., Chicago.

The Moline rail steel bar mill of the Republic Iron & Steel Co. resumed operation today after having been down for three weeks for extensive repairs.

Pig Iron.—July shipments of Northern foundry iron are keeping pace with the rate in June, though it is apparent that hot weather threatens to affect output of local foundries. Forward contracting is steady, and most of the third quarter contracts have been closed. A few users continue to show interest in needs for the remainder of the year. Spot sales are fully up to normal for this season. Southern iron is off 50c. to $14.50 a ton, Birmingham, or $20.51, delivered all rail to Chicago. A sale of 2000 tons is reported in this district. The silvery market is quiet except in shipments; furnace stocks are reported low, and prices are steady on actual sales. A few scattered sales of charcoal iron have been made at $24 a ton, furnace. Shipments are especially large to roll foundries.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	20.51
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	30.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Plates—Foremost of interest in this market is the news that several large gas pipe projects are rapidly taking shape. Plans are being prepared for a line from the Panhandle of Texas to Chicago and intermediate points. Another pipe line will extend into Iowa and Nebraska. The latter is presumably a part of the project which was to have supplied Omaha, Neb., with natural gas from the Southwest fields. Plate sales during the week were unusually large because of additional third quarter contracts and placing of orders for plates needed for 50,000 tons of pipe, contracts for which were announced last week. New business of importance in railroad cars is lacking, but car builders' steel specifications, at 6000 tons, reflect the activity on old orders. The Bettendorf Co. has ordered 3000 tons of plates, shapes and bars for 300 gondola car bodies which it will build for the Rock Island. Demand for oil storage tanks remains large and shops are heavily engaged. A Texas refiner has ordered 4000 tons of plates, and another lot of 600 tons is for delivery in the Southwest. An oil company in San Francisco has need for 750 tons of plates. On the whole, inquiry before the trade is for not less than 10,000 tons. Chicago prices for plates are firm at 2.05c. a lb. Deliveries, though somewhat improved, are not better than eight to 10 weeks.

Structural Material.—This market is moderately active. Shops are finding a greater variety of small orders and fresh inquiries, but for work of this kind competition is very keen. Architects and engineers are busier, but it is too early for the results of their work to take tangible form in the way of requests for prices for steel. Railroad needs for bridges and girder spans are larger, but individual tonnages are small. Noteworthy among the larger projects is a 36-story building for the Garrett Biblical Institute, Chicago. Fabricating shops are ordering steel in larger quantities, more as a precaution against the delivery situation than as a reflection of wider activity in the structural field. Deliveries on shapes average six weeks. Prices are firm at 2.05c., Chicago.

Mill prices on plain material, per lb.: 2.05c. base, Chicago.

Ferroalloys.—This market remains quiet, except for a few scattered quotations for less than carload lots. Prices are firm.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $40.76.

Sheets.—Uneasiness in prices for sheets is not shown in the immediate Chicago district. To the southwest and southeast, however, quotations are weak. Third quarter contracting continues, and a substantial volume of spot orders is being forwarded by users. Output is close to 85 per cent of capacity, a condition still dictated by the supply of raw steel. The roofing trade, especially in the North and Northwest, is more active. The jobbing trade is unusually active in the turnover of sheets. It has bought sparingly for the third quarter for the reason that a large part of second quarter contracts were not specified, and sellers are now allowing jobbers to draw against the old commitments.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3.10c.; No. 24 galv., 3.85c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Cast Iron Pipe.—Orders for cast iron pipe are scarce in the immediate Chicago territory. Outlying districts are bringing some business into the market, and there is a limited amount of private buying, though the bulk of this is in orders of car lot size. A Des Moines, Iowa, contractor has been awarded a general contract to lay 125 tons for Grand Rapids, Mich. Royal Oak, Mich., will take bids July 15 on 9600 ft. of 6-in. and 7800 ft. of 8-in. pipe. West Allis, Wis., is taking bids this week for the construction of 3200 ft. of 24-in. cast iron water main.

Prices per net ton, del'd Chicago: Water pipe, 6-in. and over, $45.20 to $46.20; 4-in., $49.20 to $50.20; Class A and gas pipe, $3 extra.

Bars.—New buying in mild steel bars is unusually heavy, as many users enter the market for third quarter requirements. The total of contracts at this time is fully on a par with the tonnage taken for the second quarter, while some buyers, anticipating steady use in the summer months, have signed contracts larger than those made for the second three months of this year. Specifications for the week are down a trifle, but in the aggregate they compare favorably

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.10c. to 2.40c.
Reinforc'g bars, rail steel	1.90c. to 2.05c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (⅞ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ⅞ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.

	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	3.20
Cement c't'd nails, base per keg	3.20

with shipments. As far as can be ascertained, stocks in the hands of users are small. Deferred deliveries have caused buyers to anticipate their needs farther in advance and mills are having less difficulty in arranging rolling schedules. Some automobile specialty manufacturers are taking larger quantities of bars as they prepare to furnish parts of new models. Prices for mild steel bars are steady at 2.05c. a lb., Chicago. Spot buying in alloy steel bars is active and prices are firm. Demand is steady and specifications are equal to shipments, which represent 85 per cent of local mill capacity. The iron bar market is steady because of a uniform demand from railroads. Prices are firm at 2.05c. a lb., Chicago. Specifications for rail steel bars are larger than shipments and deliveries range two to three weeks. The bed industry is active. Barn equipment manufacturers are enjoying an active early summer business.

Bolts, Nuts and Rivets.—The average of output in this district was cut temporarily this week because several plants were down for inventory taking. Shipments, partly drawn from stocks, were at a uniform rate. Demand by the railroads is reported good for this time of the year.

Reinforcing Bars.—This market is quieter than it was a week ago. Dealers estimate that inquiries on hand are fully 30 per cent smaller in aggregate tonnage than they were a year ago at this time. Fresh inquiries this week are few in number and for the most part small in tonnage. This is contrary to the experience in previous years, when interest in buying usually expanded in July. Deliveries from mills still are unsatisfactory to dealers who have not held large stocks and who have had no opportunity to expand them in recent months. The market is highly competitive, and prices lack strength. Bar shops are moderately well engaged on a large number of small orders.

Wire Products.—A seasonal lull is keenly felt in wire products. New buying is dull and specifications for most products and from a large number of buyers are measurably smaller than a week ago. This situation, sensed by producers about 10 days ago, has not led to curtailment of output. Stocks at mills have been growing smaller all through the spring and early summer months, and it seems likely that mills will maintain output at 65 per cent for some time to come, while stocks are being rounded out for the fall trade. Prices are steady on all products, with the exception of nails, on which weakening in quotations has spread over much of the Central West. Jobbers, taken as a whole, are specifying freely for this time of the year. In some quarters it is expected that not much greater recession in orders will be experienced from the manufacturing trade. To strengthen this opinion, sellers point to added activity of automobile parts makers, who are now manufacturing for new automobile models that soon are to make their appearance.

Cold-Rolled Strip.—Specifications for this commodity are liberal and operations are near capacity. Delivery promises are still close to six weeks. Manufacturers of automobiles in the medium-price field are now taking this commodity for use in new models.

Rails and Track Supplies.—The Great Northern is inquiring for 30,000 tons of standard-section rails. Other miscellaneous requests for prices from Northwestern railroads total 5000 tons. Rolling programs on old contracts have now been arranged, and local mills have settled to an even pace for the completion of these obligations. New orders for track supplies total 3500 tons, and inquiry is for not less than 8000 tons, including 5000 tons, which is still open for the Pennsylvania. Light rails are in moderate demand. Rail mills are operating at 85 per cent of capacity and accessory departments are engaged at 75 per cent.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Coke.—By-product foundry coke is firm at $8 a ton, Chicago ovens. Shipments have remained uniform in the first 10 days of July.

Old Material.—Shipments against old orders are large and well up to the average of recent weeks. Most users, with the possible exception of some foundries, continue to operate near the rate maintained in June. Brokers' obligations are large, and, with the new buying lacking, they are concentrating on filling old orders as fast as buyers will accept shipments. Incoming scrap balances well with current demand, and little trouble is being experienced with scrap appearing on track. There is one exception, however, to this and that is the fact that several mills have placed embargoes against hydraulic compressed bundles. Brokers, having no place to consign this grade, are not taking it out of yards, and dealers are being forced to pile bundles as they are made. Prices for cast grades are weak and demand is light, partly because last week many foundries closed for the full six days. Lists are being offered this week by the Missouri-Kansas-Texas, Santa Fe, Wabash, Great Northern and the Pullman Car & Mfg. Corporation.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$14.75 to $15.25
Shoveling steel	14.75 to 15.25
Frogs, switches and guards, cut apart, and misc. rails	16.25 to 16.75
Hydraul. compressed sheets	13.00 to 13.50
Drop forge flashings	10.50 to 11.00
No. 1 busheling	13.00 to 13.50
Forg'd cast and r'l'd steel carwheels	18.25 to 18.75
Railroad tires, charg. box size	18.50 to 19.00
Railroad leaf springs cut apart	18.50 to 19.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	16.75 to 17.25
Coil springs	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings	14.50 to 15.00
Low phos. punchings	16.50 to 17.00
Low phos. plates, 12 in. and under	16.50 to 17.00
Blast Furnace Grades:	
Axle turnings	10.75 to 11.25
Cast iron borings	9.75 to 10.25
Short shoveling turnings	9.75 to 10.25
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	16.00 to 16.50
Rerolling rails	17.50 to 18.00
Cupola Grades:	
Steel rails less than 3 ft.	17.75 to 18.25
Steel rails less than 2 ft.	18.25 to 18.75
Angle bars, steel	17.00 to 17.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	16.75 to 17.25
Agricultural	15.50 to 16.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	21.00 to 21.50
Iron car axles	26.00 to 26.50
Steel car axles	16.50 to 17.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	13.00 to 13.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	10.00 to 10.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	13.75 to 14.25
No. 1 agricultural cast	13.25 to 13.75
Stove plates	12.25 to 12.75
Grate bars	11.75 to 12.25
Brake shoes	10.50 to 11.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Iron Ore Imports Continue Heavy in May

WASHINGTON, July 6.—May imports of iron ore, while less than those for April, continued the heavy movement of the past few months. The total was 275,762 gross tons, compared with 284,134 tons in the preceding month and with 211,270 tons in May, 1928. For the five months the imports reached 1,223,783 tons, which is 13½ per cent higher than the total for the like period of last year.

Chile furnished a little less than half of the total imported in May. For the five months of the year, however, Chile's contribution was almost 53 per cent.

SOURCES OF AMERICAN IMPORTS OF IRON ORE
(In Gross Tons)

	May		Five Months Ended May	
	1929	1928	1929	1928
Canada	5	290	167	42,423
Cuba	56,400	33,000	269,900	164,786
Chile	130,316	141,800	646,085	624,700
Spain	13,048	.....	31,416	5,250
Sweden	22,723	.....	95,751	19,614
French Africa	25,800	34,375	84,980	194,021
Other countries	27,470	1,805	95,484	28,726
Total	275,762	211,270	1,223,783	1,079,520

New York

Structural Steel Market Active—Pig Iron Inquiries Increase—Scrap Exported to Japan

NEW YORK, July 9.—Foundry iron consumers in this district show no haste in covering their future requirements, in most cases having sufficient tonnage on hand or coming in on contracts to carry them well through the current month. Inquiry however, has increased, and upward of 8000 tons of business is in the market. Sales in the past week were about 5000 tons. Southern pig iron is not providing much competition in this district, but there is an increasing movement of Buffalo iron by barge to Central Railroad of New Jersey docks at Jersey City, where it is transferred to cars for rail delivery. Barge freight rates from Buffalo to New York were maintained at about $2.50 a ton in the spring, but, with barge operators facing competition from a low, all-rail rate to the East on grain, they are more inclined to book pig iron at rates of $2.25 a ton or less. The General Fire Extinguisher Co., Providence, R. I., has closed on about 2500 tons of foundry iron, about half with a New England furnace and the rest divided between a New York State furnace and Buffalo furnaces. The inquiry of the National Radiator Co., Johnstown, Pa., for 3500 tons of foundry iron for delivery to Trenton, N. J., is not yet reported closed, and another radiator manufacturer has about 4000 tons pending for shipment to plants outside the district. About 2000 tons of foundry is still to be bought by the Chapman Valve & Mfg. Co., Indian Orchard, Mass. The Bureau of Supplies and Accounts, Washington, will open bids July 23 on 15 tons of No. 1 and No. 3 foundry for Portsmouth, N. H., 95 tons of No. 2 and 3 foundry for the Boston Navy Yard, 100 tons of No. 2 and 3 foundry for the Philadelphia Navy Yard, 224 tons of No. 1 foundry for the Norfolk Navy Yard, and 25 tons of No. 3 foundry for Charleston, S. C. Buffalo furnaces are quoting $18 a ton, base, but while prices show greater firmness, $17.50 per ton, furnace, has not entirely disappeared.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.89 to 23.02

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Warehouse Business.—Jobbers report a slight slackening of business since the first of the month, but attribute this in part to the holiday. Structural shapes are in fair demand, and prices are well maintained. Galvanized sheets are active, but prices are still subject to occasional concessions of $1 or more a ton, and some shading is also reported on black sheets.

Cast Iron Pipe.—Prices quoted at recent openings of bids by municipalities show no tendency of the market to advance. Hartford, Conn., has opened bids on about 160 tons of 6, 8 and 12-in. water pipe. A Southern maker was low on about 85 tons of 6 and 12-in. pipe, and a Northern foundry was low on 75 tons of 8-in. The low bid on 370 tons of 8 and 12-in. pipe and 12 tons of fittings for Weston, Mass., was submitted by a Northern maker. Current buying of gas and water pipe is in most instances limited to small tonnages of about a carload to complete installations.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $33.60 to $35.60; 4-in. and 5-in., $36.60 to $38.60; 3-in., $43.60 to $45.60. Class A and gas pipe, $3 extra.

Reinforcing Bars.—The lull in buying continued the past week, and no sales or fresh inquiries of consequence are reported. Quotations, however, remain steady and unchanged.

Billet steel reinforcing bars in 40, 50 and 60-ft. lengths, 2.05c. per lb., Pittsburgh, and 2.30c. per lb., Pittsburgh warehouse, for cut lengths. Out of New York warehouse, 2.90c. per lb. for lots of 5 tons or more, 3.05c. for lots of 2 to 5 tons and 3.30c. for less than 2 tons, all delivered at job.

Ferroalloys.—Sales of several carloads and small lots of spiegeleisen are noted for early delivery at $34, furnace. There is almost no new demand for ferromanganese, but specifications on contract for both of these alloys are exceedingly heavy. This is also true of ferrosilicon and standard ferrochromium. Production of ferromanganese in June at 33,363 gross tons, according to returns to THE IRON AGE, was the largest since November, 1918, and brings the average output for the first six months to 26,700 tons a month, as compared with 26,000 tons a month in all of 1928.

Finished Steel.—The volume of buying of structural steel and plates continues at a high rate, although there has been a decided let-down during the past week in orders and specifications for most of the other forms of finished steel. A leading producer of structural shapes says that the volume of business in sight is in unprecedented amount, so that the third quarter "promises to be one of sustained high activity, rivaling the high mark during the second quarter." Awards of the week in New York included 6000 tons for the Downtown Athletic Club, 4100 tons for one telephone building and 2000 tons for another, and 4000 tons for catenary bridges for the Delaware, Lackawanna & Western Railroad. Outstanding new projects are 6000 tons for an apartment building, 2500 tons for a bank building and 3000 tons for an automobile plant, the latter to be built by the Chevrolet Motor Co. at Tarrytown, N. Y. Fabricated steel lettings in the New York metropolitan area in June amounted to 46,899 tons, compared with 34,575 tons in

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12 in. lap	3	+16

Tin Plate (14 *x* 20 *in.*)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 *x* 20 *in.*)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.40c.
No. 16	4.25c.
No. 18	4.40c.
No. 20	4.50c.
No. 22	4.60c.
No. 24	4.75c.
No. 26	5.00c.
No. 28*	5.25c.
No. 30	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

May, states the Structural Steel Board of Trade. The total for the first half of the year was 243,285 tons, as against 182,800 tons in the corresponding period of 1928, a gain of approximately 33 per cent. These figures do not include subways, bridges and similar engineering work. Weakness in prices has developed on wire nails and galvanized sheets. On nails the $2.75 per keg price has virtually disappeared, and there have been concessions from $2.65. Galvanized sheets have been sold to jobbers at 3.50c., Pittsburgh. Otherwise the price situation seems to be fairly steady.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.29c.; plates, 2.22½c.; structural shapes, 2.19½c.; bar iron, 2.14c.

Coke.—Demand for foundry coke is good, especially for by-product, but Connellsville furnace coke is quiet at $2.75 to $2.85 per net ton, ovens. Special brands of beehive coke are $4.85 a net ton, ovens, or $8.56, delivered to northern New Jersey, Jersey City and Newark and $9.44 to New York and Brooklyn. By-product coke is quoted at $9 to $9.40 per net ton, Newark or Jersey City and $10.06, New York or Brooklyn.

Old Material.—The only active grades of scrap are No. 1 and No. 2 heavy melting steel. In the past fortnight a substantial tonnage of both grades has been shipped for export to Japan, and brokers with these contracts are still buying for such shipment. The buyer specifies that at least half the cargo must be strictly No. 1 heavy melting steel, but the rest may be No. 2 and not more than a small percentage of what is classified as No. 3 steel. Brokers buying No. 1 steel for eastern Pennsylvania delivery are paying $16 a ton for shipment to Bethlehem, Pa., $16 to $16.25 per ton, delivered Claymont, Del., and $16.50 per ton, delivered Coatesville, Pa. No. 2 heavy melting steel is being bought at $13.50 to $13.75 a ton, delivered eastern Pennsylvania. Stove plate to local foundries is off slightly, with dealers paying $10 a ton, delivered, to a consumer at Mahwah, N. J. Specification pipe is off 50c. a ton on the basis of a recent sale to a Lebanon, Pa., consumer at $15 a ton, delivered.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$12.50 to $13.35
Heavy melting steel (yard)	8.00 to 9.50
No. 1 hvy. breakable cast.	10.75 to 12.00
Stove plate (steel works).	7.75 to 8.25
Locomotive grate bars....	8.25 to 8.75
Machine shop turnings....	7.25 to 7.50
Short shoveling turnings..	7.25 to 7.50
Cast borings (blast furn. or steel works).....	7.00 to 7.25
Mixed borings and turnings	6.75 to 7.25
Steel car axles.....	19.25 to 19.75
Iron car axles.....	24.00 to 25.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire	9.50 to 10.00
No. 1 railroad wrought...	12.00 to 12.50
No. 1 yard wrought, long..	11.00 to 11.50
Rails for rolling.....	13.00 to 13.50
Cast iron carwheels.....	12.25 to 12.50
Stove plate (foundry)....	8.00 to 8.50
Malleable cast (railroad)..	14.00 to 14.50
Cast borings (chemical)..	10.00 to 10.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size.....	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

Cleveland

Mill Committed Into August in Heavy Tonnage Lines—Specifications for Sheet Products Lighter

CLEVELAND, July 9.—Specifications and new business in all lines of finished steel declined during the week. The falling off in orders was probably partly due to the holiday. The seasonal slowing down of the automotive industry is reflected in lighter specifications for steel bars, sheets and strip steel from local forging and stamping plants, some of which have discontinued night operation. Production by some of the automobile manufacturers will be light for a few weeks until they bring out new models. However, the slowing down of the demand for steel from this industry probably will be less than usual in July and August. Previous output records for the two months are expected to be broken because of the heavy production schedules of the two largest manufacturers of low priced cars, the Ford company, which is still increasing its output, and the Chevrolet company, which has made only a small reduction in its production schedule.

Delivery of steel bars, plates and structural shapes show little, if any, improvement. Most mills are fully committed for three or four weeks, or with enough tonnage to carry them into August. Some cannot promise shipments of angles in less than eight to ten weeks.

The Wabash Railroad has placed a car ferry with the Toledo Shipbuilding Co. This will require 2500 tons of plates, which will be supplied by a Pittsburgh district mill. The Ralston Steel Car Co., Columbus, is inquiring for 6500 tons of plates for 800 box cars it recently took for the Pennsylvania Railroad.

Activity in the building field has declined sharply and few jobs are in prospect.

There is some irregularity in steel bars in the local market, Cleveland mills going in some cases to 1.90c., mill, for local delivery, necessitating an outside mill price of 1.92½c. delivered, Cleveland, to meet local competition. For outside shipment 1.95c., Cleveland, appears to be firmly maintained.

On plates and structural material 1.95c., Pittsburgh, is the ruling quotation.

Pig Iron.—The market was duller the past week than for some time, evidently because of the holiday. Sales by Cleveland interests totaled barely 10,000 tons in foundry and malleable grades. Inquiry is light. Many of the smaller Ohio foundries still have enough iron due on second quarter contracts to last them about a month and will not buy until their present contracts are cleaned up, as they see no prospect of higher prices. Merchant furnace interests are now wondering whether the demand of the open-hearth furnaces will decrease during the summer to an extent that steel makers will have pig iron to sell. Producers have added somewhat to their depleted stocks as a result of the decreased demand in June. Shipments to some of the large consumers in the automotive field are expected to show a gain this month over June. On the other hand, shipping orders from some of the Ohio foundries for July have declined. A 50c. reduction on Southern foundry iron to $14.50, Birmingham, is announced, and this cut will make Southern iron more of a competitive factor against Lake iron in the southern and central part of Ohio. Local prices are unchanged at $18.50, furnace, for foundry and malleable iron for outside shipment and $19 for local delivery. Both grades are quoted at $20, furnace, for Michigan delivery.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., 1.75 to 2.25....	20.50
Malleable	19.50
Ohio silvery, 8 per cent...	29.00
Basic Valley furnace.....	18.50
Stand. low phos., Valley..	$26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Semi-Finished Steel.—The leading local producer has covered practically all of its consumers for sheet bars, billets and slabs for the third quarter at $35, Cleveland, Youngstown or Pittsburgh, this being an advance of $1 a ton over the second quarter price for billets and slabs. However, shipments of billets and slabs are still being made against $34 second quarter contracts, although these will be cleaned up shortly. Specifications have fallen off somewhat and the pressure for deliveries that existed a short time ago is no longer in evidence.

Sheets.—The market was dull the past week, both in specifications and in new business. While deliveries have generally improved, some of the mills have enough business on their books to keep them operating at capacity for five to six weeks. Although the easing up in specifications is more noticeable on full finished

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....2.25c. to	2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands, No. 12 to ⅛ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip .....*5.95c.	
Black sheets (No. 24).....3.70c. to	3.90c.
Galvanized sheets (No. 24).4.60c. to	4.75c.
Blue ann'l'd sheets (No. 10).....	3.25c.
No. 9 ann'l'd wire, per 100 lb.....	$2.95
No. 9 gal. wire, per 100 lb.....	3.40
Com. wire nails, base per keg.....	2.95

*Net base, including boxing and cutting to length.

sheets than on other grades, the capacity of mills making wide auto body sheets is still well taken up and specifications have been issued for the wide material for deliveries as far extended as October. There are no new developments in the price situation. Price shading is rather common on black sheets to 2.85c. and on galvanized to 3.60c., Pittsburgh. Blue annealed sheets and blue annealed light plates are firm.

Iron Ore.—With all previous shipping records broken in the three months since the opening of navigation, the movement of ore shows no decrease this month. Nearly all the ore is going directly to furnaces. The dock balance July 1 was 4,082,400 tons as compared with 5,050,692 tons on the same date a year ago. Receipts at Lake Erie ports until July 1 were 14,928,976 tons as compared with 11,712,316 tons for the same period last year. Shipments from these ports to furnaces during the same period were 11,793,868 tons as against 9,326,909 tons for the same period last year.

Wire Products. — Manufacturers wire continues to move fairly well, although in not so good volume as recently. A slight slowing down of the bolt and nut industry has caused a decrease in the demand from that source. Regular prices on both nails and wire appear to be generally maintained in Cleveland, but prices are reported to be spotty in some of the competitive points.

Warehouse Business.—Orders show a moderate decline on all lines as compared with last month. New extras on blue annealed sheets are being maintained. Prices on black and galvanized sheets are holding well in spite of weakness of mill prices. Other prices are firm.

Strip Steel.—Specifications for both hot and cold-rolled strip steel were light the past week, and deliveries have materially improved except on very narrow hot strip or material 2 in. and less in width. Delivery promises on wide strip are from two to five weeks. Prices are firm. Some of the mills have become well caught up with deliveries on cold-rolled strip, and the 2.75c., Cleveland, price has become more common, mills finding it more difficult to get 2.85c. for small lots.

Coke.—Some third quarter contracts for by-product foundry coke were placed during the week subject to monthly price adjustments. This coke is quoted at $8.25, Painesville, for July shipment. By-product coke for domestic use shows more life than recently. The price is unchanged at $4.50, ovens, and $6 for Cleveland delivery. A price advance of 25c. a ton is reported in Detroit.

Old Material.—The market was very dull the past week. No lots of any size were purchased by mills. With shipments to local mills greatly restricted, dealers are not buying steel-making scrap for Cleveland delivery. As a result, considerable scrap is backing up in producers' and dealers' yards. Local quotations are unchanged, but there is not enough business in steel-making grades to test prices. Dealers are paying $11 for small lots of blast furnace scrap. There is a fair demand for steel-making scrap from the Youngstown district, and dealers are paying $17.50 for No. 1 heavy melting steel and $17 for compressed sheet steel for delivery to that district.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$15.00 to $15.50
No. 2 heavy melting steel	14.50 to 15.00
Compressed sheet steel	14.50 to 15.00
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	13.00 to 13.25
Machine shop turnings	9.25 to 9.50
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	13.00 to 13.50
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades	
Cast iron borings	10.75 to 11.00
Mixed borings and short turnings	10.75 to 11.00
No. 2 busheling	10.75 to 11.00
Cupola Grades	
No. 1 cast	16.75 to 17.25
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.50 to 19.00
Miscellaneous	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.60c.
Cold-fin. steel, sq. and flats	4.10c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅛-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.10c.
†Galvanized sheets (No. 24)	4.85c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Philadelphia

Mill Operations Slacken—Railroads to Ask Suspension of Birmingham Rail and Water Rates

PHILADELPHIA, July 9.—Steel mill operations have been slightly reduced since the beginning of the month, partly because of a smaller volume of specifications on contracts and partly because of warm weather and need to repair equipment. Consumers, however, have only small stocks of material, and those who are specifying as a rule press for prompt delivery.

Except on black and galvanized sheets, prices are well maintained. The recent opening of bids by the Pennsylvania Railroad on 300,000 tie plates and 10,500 kegs of spikes brought out quotations of $2.80 per 100 lb. for ordinary spikes, $2.95 per 100 lb. for copper bearing spikes and $51 per ton for heavy duty copper bearing tie plates, all f.o.b. Pennsylvania Railroad at manufacturer's plant.

Inquiry for pig iron is improving, but sales of Birmingham iron in this district are still rather limited. Eastern railroads are preparing a petition to the Interstate Commerce Commission requesting suspension of the rail and water rates from Birmingham to Atlantic Coast ports, which were to be effective early in August. Should the petition be granted a long delay in applying these rates may ensue.

Pig Iron.—Birmingham foundry iron is being offered to consumers in eastern Pennsylvania at $14.50 per gross ton, furnace, and basic at $13.50 per ton, furnace. Although a rail and water freight rate, via Savannah, of $5.25 per ton, loaded on cars, Philadelphia, has been granted to become effective early in August, sellers of Birmingham iron are not quoting delivered prices on this rate, as eastern railroads are preparing a petition to the Interstate Commerce Commission which may delay its application for six to seven months pending an investigation by the commission. When encountering competition from Southern iron quoted at $20.87 per ton, delivered, on an all-rail rate of $6.37, or $19.64 per ton, alongside dock, Philadelphia, eastern Pennsylvania furnaces have only found it necessary to shade $21.50 per ton, delivered, by about 50c., as most small foundry users are unwilling to change the brand of their iron unless the saving is considerable. Among current inquiries is 1500 tons of cylinder iron for the Baldwin Locomotive Works, which was bought from an Alabama furnace on two previous orders for cylinder and floor iron. The Bureau of Supplies and Accounts, Washington, opens bids July 23 on about 400 tons of foundry iron for Navy Yards on the Atlantic Coast, and is also inquiring for small lots of iron for Puget Sound Navy Yard and for shipment to Cavite, Philippine Islands. The Panama Canal Commission is inquiring for about 100 tons of low phosphorus iron. The Consolidated

Machine Tool Corporation, Rochester, N. Y., has bought 600 tons of foundry iron for its Hilles & Jones plant from an eastern Pennsylvania furnace.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.76 to $22.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.26 to 22.76
East. Pa. No. 1X	22.76 to 23.26
Basic (del'd east. Pa.)	20.25 to 21.00
Gray forge	20.50 to 21.00
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.04
Va. No. 2X, 2.25 to 2.75 sil.	24.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Billets.—Contracts have been made at $35 per ton, Pittsburgh, for re-rolling billets and $40, Pittsburgh, for forging quality. An effort to maintain forging billets at $41, Pittsburgh, or $6 a ton more than rerolling quality, has been abandoned.

Bars.—Deliveries range from two to three weeks with most mills, and prices are firm at 1.95c., Pittsburgh, or 2.27c., delivered Philadelphia. Operating rates of mills have receded slightly from the high level of the past quarter, partly because of the slackening of demand from automobile manufacturers.

Reinforcing Bars.—Projects requiring reinforced concrete are increasing and competition for tonnage is keen. About 400 tons of bars are still pending for a bridge over the Raritan River, and the building for the Woman's Medical College and Hospital in Philadelphia requires a substantial tonnage of bars. Billet steel bars are quoted at 2c. to 2.05c., Pittsburgh, or 2.32c. to 2.37c., delivered Philadelphia, by Pittsburgh mills. Occasionally eastern Pennsylvania mills rolling billet steel bars have quoted as low as 1.95c., Pittsburgh, or 2.27c., Philadelphia, without the usual extra of $5 a ton for cutting to length. Rail steel bar sellers quote about 1.95c. per lb., Franklin, Pa., or Tonawanda, N. Y., with no extra for cutting to length.

Shapes.—Prices continue irregular, ranging from 1.95c. to 2c., f.o.b. nearest mill to consumer, or 2.01c. to 2.06c., delivered Philadelphia. Occasional small tonnages bring up to 2.05c., mill, or 2.11c., Philadelphia. Fabricating shops are well booked with tonnage, especially bridge work. The Pennsylvania Railroad opens bids July 25, on two bridges over the Hackensack River at Marion, N. J., requiring about 14,000 tons. Two office buildings in Philadelphia will require about 4000 tons of fabricated steel.

Plates.—Car builders and the railroads are providing the greater part of the tonnage being rolled at present, but some substantial orders from shipyards are still pending award. About 4000 tons of plates will be required for each of the cruisers to be constructed by the New York Shipbuilding Corporation, Camden, N. J., and the Philadelphia Navy Yard. Plates are quoted at 2.05c., Coatesville, or 2.15c., delivered Philadelphia.

Old Material.—All grades of scrap are inactive, but No. 1 heavy melting steel is evidently stable at $16.50 per ton, as brokers with contracts are paying up to $16.50 to secure sufficient material. Heavy breakable cast is slightly stronger, a sale having been made last week at $15.25 per ton, delivered. Cast iron carwheels also show an advance in price, following sales at $16.50 and $16.75 per ton, delivered to eastern Pennsylvania consumers.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$16.50
Scrap T rails	16.00
No. 2 heavy melting steel	$12.50 to 14.00
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.50 to 15.00
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	11.50
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	15.00 to 15.25
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	11.50 to 12.00
No. 1 low phos., hvy., 0.04% and under	22.00 to 23.00
Couplers and knuckles	20.00 to 21.00
Rolled steel wheels	20.00 to 21.00
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	19.00 to 19.50
Steel axles	23.00 to 23.50
No. 1 forge fire	14.00
Cast iron carwheels	16.50 to 16.75
No. 1 cast	16.50 to 17.00
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

Sheets.—Black and galvanized sheets are being quoted at 2.85c. to 2.90c., Pittsburgh, or 3.17c. to 3.22c., Philadelphia, for black, and 3.60c. to 3.65c., Pittsburgh, or 3.92c. to 3.97c., Philadelphia, for galvanized. Blue annealed sheet prices are unchanged at 2.35c. per lb., Pittsburgh, or 2.67c., Philadelphia, for No. 13 gage, and light plates, blue annealed, are quoted at 2.10c. to 2.20c., Pittsburgh, or 2.42c. to 2.52c., Philadelphia, for No. 10 gage. The practice of granting reductions of as much as $2 a ton to large warehouse distributers has been renewed recently by some sellers of sheets, but blue annealed have apparently not been subject to such reductions except where they were included in an assortment bought by a jobber.

Imports.—In the week ended July 6, pig iron arrivals at this port totaled 805 tons of which 755 tons was from British India and 50 tons from the Netherlands. A total of 33 tons of manganese ore was received from Germany, and 40 tons of ferromanganese arrived from the United Kingdom. Steel imports consisted of 35 tons of steel bars, 53 tons of steel scrap and 112 tons of structural shapes from Germany and 475 tons of structural shapes from Belgium.

Advances on Some Grades of Scrap in Detroit

DETROIT, July 9.—Owing to the fact that several of the large mills and furnaces have come into the market, long turnings and new No. 1 busheling advanced 50c. a ton during the past week, with heavy melting and shoveling steel, hydraulic compressed, sheet clippings and flashings showing a 25c. rise.

Pig iron shipments are somewhat lower for the month in the district, but are equal to production of the furnaces supplying the Michigan melters.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$14.00 to $14.50
Borings and short turnings	9.00 to 9.50
Long turnings	8.00 to 8.50
No. 1 machinery cast	12.50 to 13.00
Automobile cast	13.00 to 13.50
Hydraul. comp. sheets	13.75 to 14.25
Stove plate	9.00 to 9.50
New No. 1 busheling	12.50 to 13.00
Old No. 1 busheling	11.00 to 11.50
Sheet clippings	8.75 to 9.25
Flashings	12.75 to 13.25

Steel Frame Houses to Be Built in South America

Materials for five steel frame houses have been assembled and shipped to Cartagena, South America, by the Broderick Firesafe Homes Association, New York. These houses, which are to be erected in a suburb of Cartagena by the National Construction Co. of that city, are designed to be not only fire-safe, but also quake-safe, and proof against attacks of white ants, an item of major importance in southern countries. In addition to the steel frame work and roof and floor members, the wire lath, plumbing fixtures and equipment, lighting and wiring equipment, hardware, woodwork, wrought iron, fencing and piping were included in the shipment.

MOVEMENT OF LAKE SUPERIOR ORE, IN GROSS TONS

	June, 1929	June, 1928	Season to July 1 — 1929	Season to July 1 — 1928
Escanaba	887,954	831,478	2,143,251	1,468,202
Marquette	718,570	558,212	1,627,994	875,248
Ashland	1,264,834	1,235,019	2,797,949	1,868,775
Superior	3,078,322	2,423,990	6,428,044	3,953,793
Duluth	3,175,027	2,899,024	6,945,315	4,568,912
Two Harbors	1,049,717	978,493	2,297,385	1,560,195
Total	10,174,424	8,926,216	22,239,938	14,295,125
Increase	1,248,208	.....	7,944,813	.....

Pacific Coast

Bids Opened on 10,000 Tons of Plates for Seattle Pipe Line —Holiday Checks Trade

SAN FRANCISCO, July 6 (*By Air Mail*).—Trading in iron and steel products this week was interrupted to some extent by the holiday. A number of plants shut down Wednesday night until the end of the week. The most important development of the week was the opening of bids on the Cedar River pipe line project at Seattle, involving 10,000 tons of plates. The price structure continues to hold to the levels established some time ago.

Pig Iron.—Little of importance has come into the market during the past week. Buying is confined to immediate needs. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy. sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Awards of reinforcing steel bars this week exceeded 2300 tons and included 900 tons for the City-County Building addition, Seattle, and 200 tons for the Aeronautic Hall for the University of Washington, Seattle, both placed with the Northwest Steel Rolling Mills. The Pacific Coast Steel Co. took 500 tons for a store in Spokane and 150 tons for highway work for the State of Washington. Bids were called for this week on 1225 tons for the West Garfield Street bridge in Seattle. Pending business makes a fair tonnage. No change in out-of-stock quotations is noted in the San Francisco district, 2.30c., base, applying on carload lots and 2.60c. on smaller tonnages. Los Angeles prices continue at 2.40c., base, on carload lots and 2.70c. on less than carload lots. Merchant bar steel is firm at 2.35c., c.i.f. Coast ports.

Plates.—Only one award in excess of 100 tons was reported. This called for 110 tons for a penstock for the Cushman Dam project at Tacoma and was booked by the Seattle Boiler Works. Bids were opened this week on 10,000 tons for the Cedar River pipe line. Other pending business is confined to small tonnages. Prices remain firm at 2.35c., c.i.f.

Shapes.—Activity in the structural steel market this week was broken into by the holiday, and as a result awards were not numerous. The McClintic-Marshall Co. secured 600 tons for an exhibit building for Los Angeles County at Pomona and the Moore Dry Dock Co. secured 300 tons for a hospital at Eureka, Cal. The largest new inquiry involves 1375 tons for the West Garfield Street bridge, Seattle, bids on which open Aug. 2. Bids are being taken on 110 tons for a hangar in Seattle and on 150 tons for the Cushman Dam project, Tacoma. Plain material continues firm at 2.35c., c.i.f.

Cast Iron Pipe.—Cast iron pipe bookings exceeded 2700 tons. Los Angeles placed 1425 tons of 8-in. Class B pipe with the American Cast Iron Pipe Co. and 1148 tons of 24-in. Class C pipe with the same company. Argentieri & Colorossi secured 224 tons of 12-in. Class D pipe for Seattle. Los Angeles placed 208 tons of 4-in. Class C pipe with B. W. Kuhn Co. The United States Pipe & Foundry Co. was low bidder on 260 tons of 12-in. pipe for the East Bay Municipal Utility District, Oakland. The Daley Corporation was low bidder on 199 tons of 4 to 10-in. Class C pipe for San Diego. Great Falls, Mont., will open bids on July 8 for 162 tons of 6 and 8-in. Class B pipe, and Newport Beach, Cal., is calling for bids, to be opened July 15, on 724 tons of 4 to 12-in. Class B pipe.

Steel Pipe.—Movement of standard steel pipe recently has been confined to unimportant tonnages for the most part. The Huntington Iron Works secured 142 tons of 8-in. standard black pipe for the La Canada Irrigation District, La Canada, Cal. Los Angeles placed 227 tons of ¾ to 2-in. galvanized standard pipe with the Santa Fe Pipe & Supply Co. No large pipe line inquiries have come up recently. The 2263-ton inquiry of the Pacific Gas & Electric Co., San Francisco, for 8⅝-in. O. D. gas pipe for installation in Monterey, Gilroy and Salinas is still pending.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ¼-in. and over	3.15c.
Small angles, under ¼-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Birmingham

Pig Iron Prices Reduced to a $14.50 Base—Now at Lowest Point Since 1916

BIRMINGHAM, July 9.—Effective last week, pig iron prices were reduced to $14.50, base, from $15. This is the second reduction of 50c. a ton in the past three weeks, as the price was reduced to $15 from $15.50 when books were opened for the third quarter on June 20. The new price of $14.50 is the lowest for Birmingham iron since September, 1916. Some sales have been made to outside points at the new price, but general buying has been held in check by the recent holiday period. Buying in the district has improved since the new price was announced, but the movement so far has not been important. A large part of the third quarter production is yet to be sold. Seventeen furnaces are active, this number having been in blast for several weeks. The No. 1 furnace of the Republic Iron & Steel Co. is to be blown out in about 30 days for repairs.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15.00
Basic	14.50

Finished Steel.—Mills have entered the second half with more tonnage on the books than at this time in a number of years. The moderate let-up in new business during the last few weeks has checked the expansion in backlogs that had been continuous throughout the spring months, but they are only slightly reduced from what they were 30 days ago. Sheets were about the only important line to show improvement last week. All prices are the same. Structural steel fabricators are operating steadily at near-capacity rates. The Ingalls Iron Works Co. has booked an order for 2000 tons for the new steam power plant of the Georgia Power Co., near Atlanta, Ga. Twenty-two of a total of 23 open-hearths are active. The Tennessee company is working all of its eight at Fairfield and eight of nine at Ensley. The Gulf States Steel Co. has all six of its open-hearths at Alabama City in operation.

Old Material.—Buying is in small tonnages. There have been no price changes since the reductions reported last week.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$12.50
Scrap steel rails	12.50
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	$11.50 to 12.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought	$10.00 to 10.50
Rails for rolling	14.00 to 15.00
No. 1 cast	13.50
Tramcar wheels	13.00
Cast iron carwheels	12.50 to 13.00
Cast iron borings, chem.	13.50 to 14.00

Cast Iron Pipe.—New business of pressure pipe manufacturers has been above the average for the past two weeks. The project at New Orleans, requiring 4650 tons of 36 to 42-in. pipe, went to the United States Pipe & Foundry Co. This company also received an order from Asheville, N. C., for over three miles of 18-in. pipe and shared in a tonnage from Los Angeles to the extent of several hundred tons. Small order business has a good aggregate of pipe tonnage. Oakland, Cal., will open bids July 10 for 2200 tons of pipe. Bids were opened July 5 for a project at Houston, Miss., requiring 5300 ft. of 8-in. pipe and 15,540 ft. of 6-in. pipe. Shipments have been exceeding production during the

past few days. Prices remain at $37 to $38 for 6-in. and larger sizes.

Coke. — The movement of foundry coke has declined, owing to the observance of the Independence Day holiday period. New business is quiet. Prices are unchanged from $5, base.

Youngstown

Mills Operating at High Average of June

YOUNGSTOWN, July 9.—Following suspensions last week for the holiday observance, iron and steel companies in northeastern Ohio resumed operations this week at a rate closely approaching the high June average. Schedules reveal an average operating rate of 85 to 90 per cent.

President James A. Campbell of the Youngstown Sheet & Tube Co. believes that fall steel buying will begin earlier this year than usual, and that steel companies will feel the effect of such buying by the middle of August.

President E. T. McCleary of the Republic Iron & Steel Co. says that July business is holding up "surprisingly well" and much better than anticipated.

The Republic company is operating one machine for the manufacture of steel pipe by the electric welding process, producing tubing up to 7 in. in diameter, and is installing two additional machines to roll larger pipe.

The company is converting sheet mills at its Warren plant into tin mills and is installing modern heating furnaces. Plans are being completed for the electric power plant for the Youngstown property, designed to utilize waste gases from the blast furnaces. Electric drives are to be installed for the blooming mills.

The Liberty tin mills at Leavittsburg of the Republic Iron & Steel Co. resumed after five weeks' suspension.

The West Leechburg Steel Co., Leechburg, Pa., will install an electric drive on its new 12-in. hot strip mill, which replaces an old Belgian type mill. The motor equipment will be furnished by the Westinghouse Electric & Mfg. Co., East Pittsburgh.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	3.95c.
Boiler rivets	3.95c.
	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	65
Less than 100 lb	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb	50

St. Louis

Pig Iron Sales Improve but Uncertain Price Situation Checks Buying—Steel Demand Brisk

ST. LOUIS, July 9.—An improvement in pig iron sales during the week is reported. The St. Louis Gas & Coke Corporation sold 6100 tons, including 3000 tons of basic to an East Side melter, and 1000 tons of foundry to a local jobbing foundry; 500 tons to a Belleville stove foundry and 500 tons to a local jobbing foundry, all for third quarter shipment. As a whole, buying for third quarter has been very light, uncertainty as to the price situation caused by a second reduction of 50c. a ton by Alabama furnaces being one of the reasons assigned for the hesitancy by melters. Local makers have made no change in their prices, although it is reported that competition has been met in some instances. Southern iron is now on a $14.50 base. Most melters in the district closed their plants over the Fourth.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$20.00
Malleable, f.o.b. Granite City	20.50
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Iron and Steel.—Sales of the Granite City Steel Co. for June were 45 per cent ahead of sales for June, 1928. Demand is exceedingly brisk for this time of year. Plates and blue annealed sheets are in greater demand than other flat-rolled products. Prices are said to be well maintained. Second quarter prices for plates, shapes and bars have been continued, and unexpired contracts are being carried over into the third quarter because of the inability of mills to make full deliveries. The structural steel trade continues dull. The Laclede Steel Co. was awarded 365 tons reinforcing bars for a hospital addition. The only new reinforcing job of consequence pending is a grain elevator for the Chicago, Burlington & Quincy Railroad, 500 tons.

Old Material.—Shipments of scrap by country dealers are light, and railroads are behind in their deliveries of items sold, with the result that dealers here are short against their contracts with the mills. It is said that the mills are willing to buy, but dealers are unwilling to sell at present levels. Cast iron car wheels are down 25c. a ton and stove plate is $1 higher. Otherwise prices are unchanged. Railroad lists: Baltimore & Ohio, 20,000 tons; Wabash, 3000 tons; Great Northern, 2500 tons; Texas & Pacific, 900 tons; Chicago & Eastern Illinois, 600 tons; Ann Arbor, 200 tons; New Orleans & Great Northern, 150 tons; Southern Pacific, 25 miles of 50 lb. rail.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.50 to $14.00
No. 2 heavy melting or shoveling steel	12.75 to 13.25
No. 1 locomotive tires	15.00 to 15.50
Miscel. stand-sec. rails including frogs, switches and guards, cut apart	15.50 to 16.00
Railroad springs	17.00 to 17.50
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	15.00 to 15.50
Rails for rolling	16.00 to 16.50
Machine shop turnings	8.00 to 8.50
Heavy turnings	9.75 to 10.00
Steel car axles	19.00 to 19.50
Iron car axles	26.50 to 27.00
Wrot. iron bars and trans.	22.00 to 22.50
No. 1 railroad wrought	13.00 to 13.50
Steel rails, less than 3 ft.	17.50 to 18.00
Steel angle bars	14.25 to 14.75
Cast iron carwheels	14.00 to 14.50
No. 1 machinery cast	15.50 to 16.00
Railroad malleable	15.50 to 16.00
No. 1 railroad cast	15.00 to 15.50
Stove plate	12.50 to 13.00
Agricult. malleable	15.00 to 15.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Buffalo

Operations of Steel Mills Show No Slackening—Pig Iron Buying Chiefly in Small Lots

BUFFALO, July 9.—Buying of pig iron has been accumulating in small orders, but there has been no sizable tonnage placed here during the past week. A New York State melter is inquiring for 1500 tons of foundry and malleable and another is seeking 1000 to 1500 tons of foundry and malleable. From New England comes an inquiry for 1000 tons of foundry. The Buffalo price in the East is $18 to $18.50, furnace, with $18 being done in a good many instances where tonnage of any considerable size is involved. It is understood that a good deal of the business that is offering is going to Port Henry or Mystic. Port Henry is asking $18 to $18.50, base, for New England delivery, but has a $3.66 freight rate, as against the freight rate from Buffalo of $4.91. Some sellers are inclined to think that the major portion of the buying of pig iron has been done and that there will be little of a pronounced movement until the fall, while others think that there is a considerable tonnage to be purchased for the current quarter.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	18.50
Lake Superior charcoal	27.28

Finished Iron and Steel.—Business continues good in all lines, and operations of local mills show no slackening. There has been a curtailment of production at the American Radiator Co. plant because of a midsummer shutdown. Fabricated structural awards include two new schools at Lockport, N. Y., calling for 100 tons. The reinforcing bar market is more active. Another section of the Hertel Avenue sewer is being figured, involving 300 tons. Bids go in this week for a new building for the Jamestown Telephone Co., which will require 150 tons of reinforcing bars.

Old Material.—An inactive condition has prevailed in this market, which is almost devoid of feature. The mills are busy and consumption of scrap is keeping up, but there has been no new buying of consequence. The only prospective purchase is one which will probably be made in the next two weeks by a large user of stove plate and No. 1 machinery cast.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$17.00 to $17.25
No. 2 heavy melting steel	14.75 to 15.00
Scrap rails	16.50 to 17.00
Hydraul. comp. sheets	14.50 to 14.75
Hand bundled sheets	12.00 to 12.50
Drop forge flashings	14.75 to 15.00
No. 1 busheling	15.50 to 16.50
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	7.50 to 7.75
No. 1 railroad wrought	13.00 to 13.50
Acid Open-Hearth	
Knuckles and couplers	19.00
Coil and leaf springs	19.00
Rolled steel wheels	19.00
Low phos. billet and bloom ends	20.00 to 20.50
Electric Furnace Grades	
Short shov. steel turnings	12.00 to 12.50
Blast Furnace Grades	
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 11.50
No. 2 busheling	10.00 to 10.50
Rolling Mill Grades	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades	
No. 1 machinery cast	16.00 to 17.00
Stove plate	12.50 to 13.00
Locomotive grate bars	12.50 to 13.00
Steel rails, 3 ft. and under	19.00 to 19.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades	
Industrial	18.50 to 19.00
Railroad	18.50 to 19.00
Agricultural	18.50 to 19.00
Special Grades	
Chemical Borings	12.50 to 13.50

American Hoist & Derrick Co., St. Paul, Minn., has opened a branch office and warehouse at 337 South Anderson Street, Los Angeles, Cal., in charge of W. H. Lummus, who has represented the company on the west coast for many years.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb	3.75

Boston

Low Prices Made on 2000 Tons of Pig Iron—Cast Iron Pipe Sales Increase

BOSTON, July 9.—The purchase of 2000 tons of pig iron, half No. 2X and half No. 1X, and 500 tons of malleable by a Providence, R. I., foundry in the past week was at low prices. The business was split four ways, according to report, 1000 tons of foundry and the malleable going to the Mystic Iron Works, 400 tons to a New York State furnace, and 400 tons to one and 200 tons to another Buffalo stack. Buffalo No. 2X was purchased at a little less than $17.50 a ton, furnace, New York State No. 2X at about $18 a ton, furnace, and Mystic No. 2X at less than $20 furnace. The delivered price on all iron bought was less than $22 a ton. Furnaces all quoted a 50c. a ton differential on No. 1X iron. The malleable iron, previously reported as for a Canadian subsidiary of the purchaser, is for Providence and was sold at around $23 a ton, delivered. In contrast with the Providence business, another large consumer closed on approximately 1000 tons of No. 2X and No. 1X at substantially higher prices. Sales otherwise were in small tonnages at prices equivalent to $18 a ton, base Buffalo. A Rhode Island foundry is in the market for 700 tons of No. 1X and 600 tons of No. 2X, and a Massachusetts plant for 1000 tons of No. 1X. Another 2000-ton Massachusetts inquiry probably will be closed next week.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	$21.78 to $22.28
†Buffalo, sil. 2.25 to 2.75	22.28 to 22.78
*Buffalo, sil. 1.75 to 2.25	22.41 to 22.91
*Buffalo, sil. 2.25 to 2.75	22.41 to 22.91
East. Penn., sil. 1.75 to 2.25	24.65
East. Penn., sil. 2.25 to 2.75	25.15
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
Ala., sil. 1.75 to 2.25	21.41 to 23.27
Ala., sil. 2.25 to 2.75	21.91 to 23.77

Freight rates: $4.91 all rail from Buffalo, and $4.28 rail and water; $3.65 from eastern Pennsylvania; $5.21 all rail from Virginia; $6.91 to $8.77 from Alabama.

*All rail rate.
†Rail and water rate.

Reinforcing Bars.—The Concrete Steel Co. has taken 200 tons of billet steel bars for a local automobile service station, the largest transaction reported in some time. The market holds well at 2.66½c. a lb., base, from stock. The market for rail steel bars is inactive at 2.26½c., base, delivered common Boston freight rate points.

Shapes and Plates.—Fabricators took little work of consequence the past week, but are figuring on a fair amount of business. Competition among fabricators is still keen. Bids are being taken on a 3000-ton Boston office building.

Coke.—July shipments of by-product foundry coke from ovens to foundries to date are just about on a par with those of June. The price remains at $11 a ton, delivered, within a $3.10 freight rate zone.

Old Material.—The movement of scrap out of New England is freer, some Pennsylvania steel mills having rescinded holdup orders, but business is far from active. A further increase in shipments is expected, as all mills are now issuing shipping instructions. Materials are in limited supply and prices are quite firm. Exporters are scouring New England for scrap and may have to raise prices in order to load steamers scheduled to sail from here this month. Foundries are still absorbing a large weekly aggregate tonnage of textile and machinery cast.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$12.00 to $12.25
Scrap T rails	11.50 to 12.00
Scrap girder rails	10.50 to 11.25
No. 1 railroad wrought	12.00 to 12.50
No. 1 yard wrought	9.50 to 10.00
Machine shop turnings	6.50 to 6.60
Cast iron borings (steel works and rolling mill)	6.50 to 6.60
Bundled skeleton, long	9.50 to 10.25
Forge flashings	10.00 to 10.50
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	8.75 to 9.00
Shafting	14.00 to 14.25
Steel car axles	17.00 to 17.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.75 to 10.00
Rails for rolling	12.50 to 12.75
Cast iron borings, chemical	10.00 to 10.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.50 to $14.75
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.50 to 12.00
Railroad malleable	18.50 to 19.00

Cast Iron Pipe.—West Hartford will close bids on approximately 4500 tons of 36 and 42-in. pipe on July 17, and Hartford on 250 tons of 6, 8 and 10-in. Salem, Mass., has awarded 100 tons of 6 and 8-in. pipe to the United States Pipe & Foundry Co. Prices are steady on 4-in. pipe, but are at least $2 a ton lower on 6 to 12-in. and $3 or more on 16-in. and larger dimensions. Quotations made

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Spares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

openly are now: 4-in., $46.10 to $47.10 a ton, delivered common Boston freight rate points; 6 to 12-in., $40.10 to $41.10; and 16-in. and larger dimensions, $39.10. A $3 differential is asked on Class A and gas pipe. During the first week in July one foundry booked 16,000 tons of pipe business, the largest amount taken in any one week by this company.

Cincinnati

Further Decline of 50c. a Ton on Southern Pig Iron Checks Buying—Sheet Mills Maintain Output

CINCINNATI, July 9.—Although the pig iron melt is reported to be heavy and district foundries are busy, the sales of iron in this market have declined noticeably, which may be a reflection of the uncertainty over prices resulting from a formal reduction of 50c. a ton on Southern iron, the second of this amount within three weeks. This brings Birmingham iron down to $18.19, delivered Cincinnati, for the base grade. Contrasted with this weakness is the firmness of Northern iron, on which quotations of $18.50, base, are apparently being maintained. Melters are taking iron on current contracts at a satisfactory rate, but are extremely conservative in placing new orders. Most of the sales are of small lots for immediate shipment. Aside from two private inquiries, there is no sizable business befor the trade.

Prices per gross ton, del'v'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	18.19
Ala. fdy., sil. 2.25 to 2.75	18.69
Tenn. fdy., sil. 1.75 to 2.25	18.19 to 18.69
S'th'n Ohio silvery, 8 per cent	27.89 to 28.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Coke.—Early July specifications for by-product foundry coke have been good, although new business consists wholly of spot orders from regular customers. Domestic coke prices have been increased 25c. a ton, effective July 15, making the new quotations for delivery at Cincinnati $6.25 for egg and $5.25 for walnut.

Finished Material. — Except for slight weakness in galvanized sheets in the South, where competition for roofing contracts has resulted in price concessions on quantity orders, sheets are still selling on a strong market. A slight decrease in bookings during the past week, due to the holiday, has not materially affected backlogs, and district sheet mills report that the continued heavy demand will maintain capacity production well into the future. Consumers are covered for third quarter needs and many are now specifying against new contracts, but deliveries are delayed six to seven weeks on heavy blue annealed and full pickled sheets and four to six weeks on light blue annealed and galvanized sheets. The demand continues to be diversified, with an increase in specifications for highway construction.

Old Material.—While consumers of scrap are taking shipments on old commitments, they are showing no haste to cover for the future, fresh bookings consisting of small orders for current needs. With dealers experiencing difficulty in obtaining good heavy melting steel, prices on this grade have been increased 25c., which, with the continued steadiness of prices on other grades, reflects the stability of this market. The usual monthly lists have been announced by the Southern Railway, Norfolk & Western, Louisville & Nashville and Chesapeake & Ohio.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$13.25 to $13.75
Scrap rails for melting	13.75 to 14.25
Loose sheet clippings	9.25 to 9.75
Bundled sheets	10.50 to 11.00
Cast iron borings	9.00 to 9.25
Machine shop turnings	8.50 to 8.75
No. 1 busheling	10.50 to 11.00
No. 2 busheling	6.75 to 7.00
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	13.00 to 13.50
Short rails	18.50 to 19.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	19.25 to 19.75
No. 1 railroad cast	15.25 to 15.75
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.25 to 10.75
Railroad malleable	15.25 to 15.75
Agricultural malleable	14.25 to 14.75

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c
Blue ann'l'd sheets (No. 10)	3.45c
Structural rivets	3.85c
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain per 100 lb	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.00
4-in.	33.00
Seamless steel boiler tubes, 2-in.	17.00
4-in.	34.00

Canada

Canadian Pacific Orders Rails From Algoma Mill—Steel Plants Maintain High Operating Rates

TORONTO, ONT., July 9.—Recent developments in the iron and steel industry of Canada indicate that the present high rate of operations will be continued for some months.

The Canadian Pacific Railway has awarded a substantial rail contract to the Algoma Steel Corporation, Sault Ste. Marie, Ont., which assures double shift rolling at the rail mill for an indefinite period. The rails are to be used in connection with the proposed five-year construction program of the Canadian Pacific in Western Canada.

The Canadian Pacific Railway has closed another contract with the Canadian Car & Foundry Co., Montreal, Que., for 100 steel cars.

Rail and rolling stock orders of a substantial nature are expected almost any time from the Canadian National Railways. This railroad also has an extensive program of extension mapped out for the Canadian West, and at the same time is making improvements to its Eastern lines and equipment.

Structural Steel.—While new business is not appearing in large volume, a steady flow of orders is reported for small tonnages. Structural steel awards for the past week were considerably below those of previous weeks. Fabricators, however, are carrying large tonnage backlogs, which will keep them running at capacity for a considerable period.

Pig Iron.—Following an active forward buying movement, which resulted in the majority of large melters covering for third quarter needs, new business is again beginning to lag. Some inquiry is still coming out for future delivery iron, but this is from small interests which were in no hurry to get their orders placed. Third quarter contracting compares favorably with that of the first and second quarter. Pig iron prices are firm.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$24.60
No. 2 fdy., sil. 1.75 to 2.25	24.10
Malleable	24.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$26.00
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	24.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Old Material.—The usual summer slump is now affecting the market, and, while new business is below that of a month or six weeks ago, it stands out well above that of any of the past summers. The demand for steel scrap has become almost a dead issue for the moment, although some deliveries are being made against old contracts. Prices are firm but unchanged.

Dealers' buying prices:

	Per Gross Ton Toronto	Montreal
Heavy melting steel	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel turnings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

Fabricated Structural Steel

Non-Industrial Projects Predominate in Week's Lettings and in Fresh Inquiries

PROJECTS of a non-industrial character were predominant in the past week's structural steel lettings, which totaled about 45,000 tons. Apartment, office, club and school buildings took more than one-half of the tonnage. Structures of this type will require approximately 27,000 tons of the 49,000 tons of new work which appeared in the past seven days. Inquiries were the largest since the first week of June and indicate well sustained activity in the steel fabricating industry during the latter part of the year. Major awards included 6600 tons for two gas holders at Chicago, 6000 tons for an athletic club in New York, 5850 tons for a New York office building and 4100 tons for a telephone exchange building in New York. Among pending jobs are 14,000 tons for two bridges for the Pennsylvania Railroad, 8000 tons for the Cuneo Tower in Chicago and 6000 tons for an apartment building in New York. Awards follow:

STATE OF NEW HAMPSHIRE, 100 tons, highway bridges, to unnamed fabricator.

SALEM, MASS., 300 tons, theater, to New England Structural Co.

WALPOLE, MASS., 150 tons, manufacturing plant, to New England Structural Co.

GARDNER, MASS., 100 tons, hospital, to western Massachusetts fabricator.

CAMBRIDGE, MASS., 100 tons, four tanks, to Pittsburgh-Des Moines Co.

BRIDGEPORT, CONN., 1000 tons, power house, to Levering & Garrigues Co.

DELAWARE, LACKAWANNA & WESTERN RAILROAD, 4000 tons, catenary supports, to American Bridge Co.

NEW YORK, 6000 tons, Downtown Athletic Club, West Street, to Hedden Iron Construction Co.

NEW YORK, 4100 tons, telephone exchange building on West Fiftieth Street, to Hedden Iron Construction Co.

NEW YORK, 5830 tons, office building at Fifty-eighth Street and Fifth Avenue, to McClintic-Marshall Co.

NEW YORK, 3975 tons, Queensborough Bridge roadway, to American Bridge Co.

BALTIMORE & OHIO RAILROAD, 525 tons, bridge at Keys, W. Va., to McClintic-Marshall Co.

TRENTON, N. J., 1250 tons, building for First Mechanics National Bank, to Belmont Iron Works.

ALLENTOWN, PA., 200 tons, garage, to Lehigh Structural Steel Co.

PENNSYLVANIA RAILROAD, 500 tons, four bridges, to McClintic-Marshall Co.

HARRISBURG, PA., 3300 tons, office building, to McClintic-Marshall Co.

ATLANTA, GA., 2000 tons, new steam power plant for Georgia Power Co., to Ingalls Iron Works.

BROCKVILLE, ONT., 100 tons, Nurses' Home, to Dominion Bridge Co.

BUFFALO, 300 tons, Firestone Tire & Rubber Co., John W. Cowper Co., general contractor, to McClintic-Marshall Co.

LOCKPORT, N. Y., 100 tons, two schools, to Kellogg Structural Steel Co.

MUNCIE, IND., 600 tons, Automotive Specialty Co., to Indiana Bridge Co.

ESCANABA, MICH., 250 tons, State highway bridge in Delta County, to McClintic-Marshall Co.

CHICAGO, 6600 tons, two gas holders for Peoples Gas Light & Coke Co., to an unnamed bidder.

CHICAGO, 380 tons, office building for Inland Steel Co., to Vanderkloot Steel Works, local.

CHICAGO, 440 tons, Blackstone shop, to McClintic-Marshall Co.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC, 550 tons, girder spans, to American Bridge Co.

OMAHA, NEB., 500 tons, depot, to Milwaukee Bridge Co.

UNION PACIFIC, 200 tons, bridge, to American Bridge Co.

SASKATOON, SASK., 750 tons, building for Dominion Government, to Dominion Bridge Co.

TACOMA, WASH., 110 tons plates, penstock for Cushman project, to Seattle Boiler Works.

WALLA WALLA, WASH., 100 tons, prison building for women, to Hoflus Steel & Equipment Co.

EUREKA, CAL., 300 tons, hospital, to Moore Dry Dock Co.

LONG BEACH, CAL., 125 tons, piers A and B, to unnamed interest.

LOS ANGELES, 500 tons, exhibit building at Pomona fair grounds, to McClintic-Marshall Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

BOSTON, 3000 tons, office building, Franklin and Federal Streets.

BOSTON, 400 tons, Massachusetts School of Arts.

BOSTON, 392 tons, Boston Insurance Co. building.

BOSTON, 160 tons, Lamson & Hubbard Co. store on Boylston Street.

BOSTON & MAINE RAILROAD, 250 tons, roundhouse at Somerville, Mass.

HOLYOKE, MASS., 130 tons, Chemical Paper Co. plant.

MONTREAL, 1000 tons, office building at 618 St. James Street for James T. Stranger & Co.

NEW YORK, 6000 tons, apartment building on West Fifty-ninth Street.

NEW YORK, 2500 tons, building for County Trust Co. on Eighth Avenue.

TARRYTOWN, N. Y., 3000 tons, Chevrolet Motor Co. plant.

PENNSYLVANIA RAILROAD, 14,000 tons, two bridges over the Hackensack River at Marion, N. J.; bids open July 25.

STATE OF NEW JERSEY, 100 tons, five highway bridges at Somerville, N. J.; general contract to Richards & Gaston, Inc.

PHILADELPHIA, 3000 tons, office building and garage, 1616 Walnut Street.

PHILADELPHIA, 1000 tons, office building, Seventeenth and Sansom Streets.

PHILADELPHIA, 200 tons, Woman's Medical College and Hospital; bids open July 17.

BUFFALO, 8000 tons, new City Hall; John W. Cowper Co., low bidder on general contract.

SELFRIDGE FIELD, MICH., 700 tons, bids rejected and project postponed one year.

CHICAGO, 1000 tons, Parker junior high school.

CHICAGO, 600 tons, for Edison Electrical Appliance Co.

CHICAGO, 8000 tons, Cuneo Tower.

ROCK ISLAND, ILL., 800 tons, power house and addition to motor building for International Harvester Co.

ST. PAUL, MINN., 1300 tons, viaduct.

COLUMBIA, MO., 300 tons, trusses for roof over gymnasium, Missouri State University.

REGINA, SASK., 200 tons, parts and service building for General Motors Corporation of Canada.

SEATTLE, 1375 tons, West Garfield Street bridge; bids Aug. 2.

SEATTLE, 110 tons, hangar for Boeing Airplane Co.; bids being taken.

TACOMA, WASH., 150 tons, second unit Cushman Dam project; bids being taken.

Simplified Practice on Skid Platforms

Taking up the work on elimination of waste through simplified commercial practice, recommendation R95-28 of the United States Department of Commerce relates to skid platforms. In accordance with unanimous action of a general conference of representative manufacturers and users of skid platforms, the clearance dimensions recommended for adoption include minimum horizontal distance inside of runners, or other supports, of 29 in., and a clear height of 8 in. or 12 in., in the two standards, from the bottom of the runner or other support to the underside of the platform.

In discussing the proposed standards, it is pointed out that a hand-lift truck can be used to handle any standard skid of either of the two heights mentioned. Interchangeability of skids is essential if greatest benefit is to be derived from their use. This is a large factor in determining that a standard size be adopted.

A survey made by manufacturers showed that the lifting platforms of more than 90 per cent of the power-lift trucks were approximately 11 in. high and hence could run under the 12-in. skid. Of the hand-lift skids, 60 per cent had platforms approximately 7 in. high in the lowest position, and hence could be run under the 8-in. skid. More than 80 per cent of both types of lift trucks had lifting platforms more than 27 in. wide, and consequently are readily usable with the proposed 29-in. clearance width.

For the manufacture of full-finished automobile sheets, the Apollo Steel Co., has placed orders for a continuous sheet normalizer, three walking beam type continuous sheet pack furnaces, four walking beam type continuous pair furnaces and 11 box annealing furnaces. The equipment will be supplied by the Surface Combustion Co. The Central Alloy Steel Co., Canton, Ohio, has ordered an additional continuous sheet pack furnace, of the walking beam type, for the mills at Massillon.

Non-Ferrous Metal Markets

Copper Inactive but Firm, Tin Quiet, Lead Lower, Zinc Sales Light

NEW YORK, July 9.

Interruptions due to the holiday have slowed up all the markets and they are now just beginning to recover. All prices are steady.

Copper.—Foreign consumers are the principal buyers and have been moderately active for a week. Sales this morning were 1000 tons, which is large under present conditions. For the past week they have averaged about 1000 tons a day. If foreign consumers should absorb their average requirements, based upon consumption for recent months, they must still buy about 30,000 tons for July delivery. They have not bought much metal for August or September, and it is estimated that, if they should become at all active, their requirements would be quite heavy. Indications are that they overbought early this year. Domestic consumers still are buying only what they actually need. They have considerable metal to purchase for August and have bought very little for September. It is figured that they must soon come into the market for fairly liberal tonnages because it is known that their orders for finished material are better than for some time, particularly in wire. Primary producers continue out of the market, sales being confined almost entirely to custom smelters. In general, the market is gradually returning to the hand-to-mouth buying policy which ruled so long before the scramble for metal advanced the price to 24c. early this year. Another factor possibly holding up purchases is the announcement of statistics for June, which should be out this week. It is freely acknowledged that this will reveal a liberal increase in stocks, but that the curtailment of output will begin to show up. Prices are unchanged and steady, with electrolytic copper quoted at 18c., delivered in the Connecticut Valley, and at 18.30c. c.i.f. usual European ports. Lake copper is moderately active and unchanged at 18c. to 18.12½c., delivered. Some buying for early July delivery is reported for both Lake and electrolytic copper.

Tin.—Sales of Straits tin for the week ended Saturday, July 6, were light, at 700 to 800 tons, mostly to consumers. The delivery involved has been principally nearby metal and the feature has been the steadi-

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	July 9	July 8	July 6	July 5	July 3
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	45.12½	45.12½	....	45.12½	45.12½
Zinc, East St. Louis	6.70	6.70	6.70	6.70	6.70
Zinc, New York	7.05	7.05	7.05	7.05	7.05
Lead, St. Louis	6.70	6.70	6.70	6.75	6.80
Lead, New York	6.90	6.90	6.90	6.90	7.00

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

Prices on rolled non-ferrous products are unchanged from those prevailing one week ago.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
High brass ..... 23.25c.
Copper, hot rolled ..... 26.75c.
Zinc ..... 10.25c.
Lead (full sheets) ... 11.00c. to 11.25c.

Seamless Tubes—
High brass ..... 28.25c.
Copper ..... 29.25c.

Rods—
High brass ..... 21.25c.
Naval brass ..... 24.00c.

Wire—
Copper ..... 19.87½c.
High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.
Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
Tubes, base ..... 42.00c.
Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.00c.
Lead, wide	11.90c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	21.12½c. to 22.12½c.
Copper, hot rolled, base sizes	27.75c. to 28.75c.
Copper, cold rolled 14 oz. and heavier, base sizes	30.00c. to 31.00c.
Seamless Tubes—	
Brass	26.00c. to 27.00c.
Copper	29.12½c. to 30.12½c.
Brazed Brass Tubes	29.12½c. to 30.12½c.
Brass Rods	18.87½c. to 19.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks ..... 10.50c. to 11.00c.
Zinc sheets, open .... 11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig ..... 46.50c. to 47.50c.
Tin, bar ..... 48.50c. to 49.50c.
Copper, Lake ..... 19.50c.
Copper, electrolytic ..... 19.25c.
Copper, casting ..... 19.00c.
Zinc, slab ..... 7.75c. to 8.25c.
Lead, American pig ... 7.62½c. to 8.12½c.
Lead, bar ..... 9.62½c. to 10.12½c.
Antimony, Asiatic ..... 10.50c. to 11.00c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) ..... 25.00c. to 26.00c.
Alum. ingots, No. 12 alloy, 24.00c. to 25.00c.
Babbitt metal, commercial grade, 30.00c. to 40.00c.
Solder, ½ and ½ ..... 30.00c. to 31.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig ..... 49.63c.
Tin, bar ..... 51.63c.
Copper, Lake ..... 19.50c.
Copper, electrolytic ..... 19.25c.
Copper, casting ..... 18.75c.
Zinc, slab ..... 7.75c. to 8.00c.
Lead, American pig ..... 7.75c. to 8.00c.
Lead, bar ..... 10.00c.
Antimony, Asiatic ..... 16.00c.
Babbitt metal, medium grade ..... 19.00c.
Babbitt metal, high grade ..... 53.75c.
Solder, ½ and ½ ..... 31.25c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	14.50c.	16.00c.
Copper, hvy. and wire	14.25c.	15.625c.
Copper, light and bottoms	12.50c.	13.50c.
Brass, heavy	8.50c.	9.50c.
Brass, light	7.50c.	8.50c.
Hvy. machine composition	11.50c.	12.75c.
No. 1 yel. brass turnings	9.50c.	10.25c.
No. 1 red brass or compos. turnings	11.25c.	12.25c.
Lead, heavy	5.50c.	5.75c.
Lead, tea	4.25c.	5.25c.
Zinc	3.50c.	4.25c.
Sheet aluminum	14.00c.	16.00c.
Cast aluminum	12.25c.	14.25c.

ness of prices, which have held close to 45c. Spot metal continues to sell at a discount, or about 1c. per lb. below December-January. Not much has been heard in the last week about activities of "the group" in London. They are still buying some metal to support the market and were more active today. Spot Straits tin is quoted today in a dull market at 45.12½c., New York. London prices today were about £3 per ton higher than week ago, with spot standard quoted at £204 10s., future standard at £207 15s. and spot Straits at £208. The Singapore price today was £210 5s.

Lead.—A change in its contract price from 7c. to 6.90c., New York, was made on Friday, July 5, by the American Smelting & Refining Co. Following this, the leading producer in the West lowered its quotation from 6.80c. to 6.75c., St. Louis, and later to 6.70c., which is now the market. Demand, particularly for spot and early delivery, is reported very good.

Zinc.—The price situation in prime Western zinc continues somewhat mixed. Demand is very light and is easily being absorbed by one or two companies, which are taking orders at 6.70c., East St. Louis. Another company is quoting 6.75c., and doing some business. Those producers which for some time have maintained their quotation of 6.80c., East St. Louis, still adhere to this policy and have been doing their share of the business. In fact, in one week during June, statistics of the American Zinc Institute show that, out of 2800 tons sold that week, 2200 tons went at 6.80c. It is felt that galvanizers in particular and some other consumers must soon come into the market, and it would not be surprising if a little later the quotation should reach 6.80c. as the minimum. One company placed a large order for delivery this month during the last week and may place a similar order before the month closes.

Antimony.—Because holders of Chinese metal prefer to make sacrifices rather than put the metal in warehouses, the market is somewhat depressed and the metal is selling at 8.50c. for spot and 8.62½c. for future, duty paid, New York.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c. per lb., with shot nickel at 36c. and cathodes of electrolytic nickel at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is obtainable at the published price of 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, July 9.—This market was quiet during the early part of the week, but in recent days has turned more lively. Prices for tin are higher, while quotations on lead are lower. The old metal market is quiet.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 45.75c.; lead, 6.85c.; zinc, 6.80c.; in less-than-carload lots: antimony, 9.75c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.25c.; pewter, No. 1, 24.50c.; tin foil, 26c.; block tin, 36c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Railroad Equipment

Western Refrigerator Line Building 500 Cars

ABSENCE of railroad equipment buying on a large scale was noted during the past week. The dearth of inquiries indicates that the dullness which pervades the market will continue in the near future. The Western Refrigerator Line Co., recently organized, is building 500 refrigerator cars. The Manila Railroad has ordered 100 flat cars and 100 box cars, while the Canadian Pacific has bought 100 steel cars from a Canadian car manufacturer. The Reading is inquiring for 200 all-steel gondola cars. The Great Northern is expected to purchase 12 locomotives of the 4-8-4 type. Details of the week's business follow:

Canadian Pacific has ordered 100 steel cars from Canadian Car & Foundry Co.

Great Northern is inquiring for 12 locomotives of 4-8-4 type.

Chicago, North Shore & Milwaukee has ordered 25 interurban parlor motor cars from Standard Steel Car Co.

John A. Roebling's Sons Co., Trenton, N. J., has ordered 12 gondola cars from American Car & Foundry Co.

United Fruit Co. is inquiring for 50 banana cars.

Norfolk & Western will build 10 all-steel box express cars in its own shops.

Reading is inquiring for 200 all-steel gondola cars.

New York, New Haven & Hartford is inquiring for 50 70-ton brick cars.

Manila Railroad has ordered 100 flat cars and 100 box cars of 30-ton capacity from Gregg Co.

Savannah & Atlanta is inquiring for three switching locomotives.

American Locomotive Co. has received orders for one locomotive from Delaware & Hudson and one from Standard Oil Co. of Indiana. Baldwin Locomotive Works will furnish one locomotive to Illinois Northern.

Western Refrigerator Line Co., recently organized, is building for its own account 500 refrigerator cars in shops of American Car & Foundry Co.

Cudahy Packing Co. is in market for 50 refrigerator car underframes.

Chicago, Milwaukee, St. Paul & Pacific will buy 15 caboose car underframes.

The Weirton Steel Co., Weirton, W. Va., has acquired the Isabella mine of the Hecla Coal & Coke Co., near Brownsville, Pa. The purchase included 1200 acres of coal lying along the Monongahela River, which is fully developed and equipped with modern facilities for the preparation and shipment of coal by both rail and river.

Reinforcing Steel

Inquiries Are Heaviest Since Early in May

ALTHOUGH awards showed a decrease in the past week, inquiries were the heaviest since early in May. The largest letting was 1000 tons for a power plant at Michigan City, Ind., and a building at Seattle, Wash., will take 900 tons. The total business for the week was about 4700 tons. Pending jobs amounting to 4300 tons include 1225 tons for a highway bridge at Seattle, 1000 tons for a store at Dubuque, Iowa, and 500 tons for a grain elevator for the Burlington railroad at St. Louis. Awards follow:

BOSTON, 200 tons, automobile service station, to Concrete Steel Co.

NEW YORK, 200 tons, subway work, to McClintic-Marshall Co.

NEW YORK, 200 tons, route 1, section 19, of subway, to McClintic-Marshall Co.

HEMPSTEAD, N. Y., 100 tons, school, to Truscon Steel Co.

MICHIGAN CITY, IND., 1000 tons, power plant, to an unnamed bidder.

PEORIA, ILL., 300 tons, bridge, to Kalman Steel Co.

CHICAGO, 150 tons, Norwegian-American Hospital, to Concrete Engineering Co.

CHICAGO, 350 tons, Victor X-Ray Co., to Joseph T. Ryerson & Son.

ST. LOUIS, 265 tons, addition to Barnes Hospital group, to Laclede Steel Co.

SACRAMENTO, CAL., 150 tons, hotel, to W. S. Wetenhall Co.

SALINAS, CAL., 202 tons, sewer project, to unnamed bidder.

SAN FRANCISCO, 100 tons, fire wall, Sixteenth and Wisconsin Streets, to W. S. Wetenhall Co.

SPOKANE, WASH., 500 tons, Montgomery Ward building, to Pacific Coast Steel Co.

SEATTLE, 900 tons, City-County Building addition, to Northwest Steel Rolling Mills.

SEATTLE, 200 tons, Aeronautics Hall, University of Washington, to Northwest Steel Rolling Mills.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

JERSEY CITY, N. J., 135 tons, garage, general contract to Industrial Engineering Co.

BUFFALO, 300 tons, additional section, Hertel Avenue sewer.

JAMESTOWN, N. Y., 185 tons, telephone exchange building.

CLEVELAND, 250 tons, factory addition for Richman Brothers.

CINCINNATI, 200 tons of bars for sewer construction.

DUBUQUE, IOWA, 1000 tons, store; C. W. Nichol, architect.

BENTON HARBOR, MICH., tonnage not stated, theater and store; C. W. Nichol, architect.

CHICAGO, 200 tons, office building; McLellon Construction Co., contractor.

CHICAGO, 300 tons, for Victor X-Ray Co.; previously reported as 100 tons.

ST. LOUIS, 500 tons, grain elevator for Burlington Railroad.

SEATTLE, 1225 tons, West Garfield Street bridge; bids Aug. 2.

AMERICAN LAKE, WASH., 125 tons, hospital; bids being taken.

PERSONAL

HERBERT F. PERKINS, Chicago, the new president of the International Harvester Co., has long been a conspicuous figure in the Harvester organization. His ability and experience well equip him for the responsibilities which ALEXANDER LEGGE was

H. F. PERKINS

obliged to give up when President Hoover summoned him to the chairmanship of the Federal Farm Board. Mr. Perkins has had over 30 years of continuous service in the farm implement industry—three years with the McCormick Harvesting Machine Co. which he joined in 1898 to develop its purchasing department, and then more than 27 years among the executives of the Harvester company. Soon after the formation of the latter in 1902 he organized the purchasing department of the combined companies, and in 1906 was made operating manager of the steel and lumber properties. Later, when these properties were organized as the Wisconsin Steel Co. and the Wisconsin Lumber Co., he became president of both. Subsequently he was elected vice-president of the Harvester company in charge of manufacturing in the United States and abroad. In 1922 he was elected first vice-president, with general executive duties, aiding the president and substituting for him in his absence. During the war, Mr. Perkins spent a number of months in Washington as business adviser to the chairman of the War Labor Policies Board. He also served as representative of the Chamber of Commerce of the United States in President Wilson's first industrial conference. He is a vice-chairman of the National Industrial Conference board, and has been a director of various Chicago banks. He is in his sixty-fifth year.

H. R. SMALLMAN, for the past three years assistant to the sales manager of Hanson-Van Winkle-Munning Co., has been made manager of the Chicago office, with headquarters at 549 West Washington Boulevard. H. M. CHERRY, who has represented the company in Michigan for the past seven years, has been appointed manager of the Detroit office, 5415 Twelfth Street, and LOUIS M. HAGUE has become manager of the Pittsburgh and Cleveland office, with headquarters at 106 Liberty Avenue, Pittsburgh.

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THOMAS W. STONE has been elected a vice-president of the Western Gas Construction Co., Fort Wayne, Ind.

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J. P. ARMSTRONG has been appointed by Geuder, Paeschke & Frey Co., Milwaukee, to take over the management of the metal stampings contract division of the company for California, with headquarters in the Balboa Building, San Francisco.

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CHRISTIAN WILSON, JR., formerly general manager of the Montreal plant of the Bryden Neverslip Co., has been elected general superintendent of the Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa., succeeding F. D. ANDREWS, who resigned. After graduation from Lehigh University with the degree of mechanical engineer, Mr. Wilson became associated with the Bethlehem Steel Co. and later with the Pennsylvania Power & Light Co.

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WILLIAM L. DITGES has been elected vice-president in charge of engineering of the Mackintosh-Hemphill Co., Pittsburgh. He has been with the company since 1916, serving successively as chief draftsman, assistant chief engineer and chief engineer. He received his education at Cologne, Germany, and prior to going with Mackintosh-Hemphill Co. was connected with the Carnegie Steel Co. at New Castle, Pa., the Nichols Copper Co., New York, and the Bethlehem Steel Co. W. R. DUDA succeeds Mr. Ditges as chief engineer. He has been with this company for 11 years, for the past several years in the capacity of assistant chief engineer. His previous connections included five years with the United Engineering & Foundry Co. and four years with the American Sheet & Tin Plate Co.

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S. M. ALBERTSON has been appointed contact engineer for the Bantam Ball Bearing Co., South Bend, Ind. He was formerly connected with the Central Specialty Co., Detroit.

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THOMAS EVANS, vice-president, Merchant & Evans Co., Philadelphia, CHARLES R. HOOK, vice-president, American Rolling Mill Co., Middletown, Ohio, and CHARLES PIEZ, chairman, Link-Belt Co., Chicago, are members of a committee appointed to study immigration questions for the Chamber of Commerce of the United States.

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F. O. SCHRAMM, who has been appointed general manager of sales of the Pressed Steel Car Co., New York, as briefly mentioned in last week's

F. O. SCHRAMM

issue of THE IRON AGE, has been with the company for 22 years, having started at the age of 16 as a stenographer in the operating department of the Pressed Steel Car Co.'s subsidiary, the Western Steel Car & Foundry Co. He worked in various capacities in the operating and sales departments at the Hegewisch plant and in the Chicago office until Jan. 1, 1917, when he was transferred to the New York office. He became assistant secretary in 1921 and assistant general sales manager on Feb. 1, 1928. His appointment as general manager of sales took effect July 1. C. E. POSTLEWAITE, who has been made assistant vice-president of the Pressed Steel Car Co., entered the service of the company in 1897. Previous to that time he was engaged in railroad work, from 1883 to 1890 as rodman, telegraph operator and car clerk for the Pennsylvania Railroad and from 1890 to 1897 in various capacities ranging from chief clerk to general superintendent of the Norfolk & Western. Mr. Postlewaite went with the Schoen Pressed Steel Car Co. in 1897, continuing with the Pressed Steel Car Co. when the Schoen company was merged with Pressed Steel. He was appointed general sales manager of the company in 1915, and served in that capacity until July 1, when he was appointed assistant vice-president.

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THEODORE KIPP, vice-president and managing director of Kipp-Keppy Ltd., Winnipeg, Canada, and presi-

dent of the Winnipeg Service Co., has been reelected chairman of the new industries committee of the Industrial and Development Board of Manitoba. He recently returned from Europe and says that European manufacturers look with favor on establishing branch factories in Canada. He is also vice-president of the Canadian Engineering & Construction Co., vice-president of Sullivan-Kipp-Chase, director of William Hamilton, Ltd., and vice-president of the Canadian Novadel, Ltd.

—

L. H. BEYER, for many years connected with the American Radiator Co. in Buffalo and New York as manufacturing department executive and as director of purchases, has become

L. H. BEYER

sales director of the Durbar bearing bronze division of the Buffalo Bronze Die Cast Corporation, Buffalo.

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HENRY JACOBSON, who has been identified with the baling press industry for many years, has been appointed chief engineer of the Galland-Henning Mfg. Co., Milwaukee.

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T. W. BATTLE has been appointed district manager of the Combustion Engineering Corporation, for the Charlotte, N. C., territory, with office at 919 Johnston Building. I. S. FORDE has been made acting district manager of the Atlanta district to succeed T. J. CLEARY, resigned, with offices in the Candler Building, Atlanta. E. WALTHALL has been appointed district manager of the New Orleans territory, with office in the Union Indemnity Building.

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W. M. CUSAC has been appointed a member of the Chicago sales force of the American Hoist & Derrick Co., St. Paul, Minn. He was formerly connected with the McMyler-Interstate Co., Cleveland.

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FRANK W. FRY has become associated with Hausman & Wimmer Co., scrap dealer, New York.

H. J. FREYN, president Freyn Engineering Co., Chicago, sailed for Europe on the Aquitania July 7, on a business trip lasting until the end of the summer, including Russia, where his company is engaged in iron and steel engineering work.

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A. E. ADAMSON, heretofore of the Acme Steel Co., is now connected with the sales department of the Brainard Steel Corporation, Warren, Ohio. Mr. Adamson is a brother of W. J. Adamson, vice-president of the company. He was at one time connected with the American Tube & Stamping Co., Bridgeport, Conn., and prior to that was in the operating department of the Trumbull Steel Co.

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C. B. KARLSON, vice-president, Seamless Steel Equipment Corporation, 39 Broadway, New York, sailed July 6 for a six weeks' business trip to France, Germany and England.

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BURNHAM FINNEY, who for the past five years has been editorial representative of THE IRON AGE at Cincinnati, has been made a member of the New York staff, with broader activities. He has been succeeded at Cincinnati by ROBERT G. MCINTOSH, who formerly was associated with the Cincinnati *Enquirer* and for the past few years has represented several business papers.

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GEORGE F. BAIN has been made manager of the northeastern district, which includes New England and New York north of Westchester and Rockland counties, for the Copperweld Steel Co., Glassport, Pa. PAUL VAN WAGNER continues as district manager for New York, New Jersey, Pennsylvania and West Virginia. The headquarters for both will be at 30 Church Street, New York.

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H. L. RITTS, for the past 10 years sales manager of Holcroft & Co., Detroit, has become general sales manager of the William H. Nicholls Co., Inc., Richmond Hill, N. Y., and will be in charge of sales and engineering offices at 207 Curtis Building, Detroit. S. H. SUTTON, formerly of the Chicago Gas Light & Coke Co., has been appointed Chicago district manager. The company has expanded its line of molding machines to include a complete molding machine conveyor and sand-conditioning equipment.

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J. W. MORGAN has been appointed assistant secretary and treasurer of the Brainard Steel Corporation, Warren, Ohio.

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F. H. WILLCOX, vice-president Freyn Engineering Co., Chicago, returned July 2 on the Homeric from a six weeks' business trip in England in connection with consulting work for the Ford Motor Co.

Obituary

RALPH W. CLARK, one of the best known pig iron men in the East, died at State Hospital, Scranton, Pa., July 4, from complications following typhoid fever. His death came unexpectedly after he had passed the crisis of the fever itself. Mr. Clark had spent about 27 years in the pig iron business. He had only recently passed his 45th birthday. For about 20 years he was with the old firm of Rogers, Brown & Co., now Rogers, Brown-Crocker Brothers, Inc. He was for a time in the Buffalo office of that firm, and came to the New York office in 1906, continuing as salesman in the New York district

R. W. CLARK

until 1922, when he was appointed district sales agent in New York for Pilling & Co., of Philadelphia. A year later he was elected a vice-president of Pilling & Co. This position he resigned in September, 1928, to become connected with the Hudson Coal Co., Scranton, Pa., which is owned by the Delaware & Hudson Railroad Co. Effective Jan. 1, Mr. Clark became vice-president and general sales agent of the Chateaugay Ore & Iron Co. and the Chazy Marble Lime Co., both subsidiaries of the Hudson Coal Co., and at that time he took charge of the sale of Chateaugay pig iron, which had been handled for years by Pilling & Co.

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WILLIAM M. TOBIAS, until Sept. 1, 1925, general purchasing agent for the Bethlehem Steel Corporation, died at Lake Placid, N. Y., July 6, aged 64 years. He had been connected with the company for about 25 years, with the exception of about two years when he became associated with Milliken Brothers Mfg. Co., fabricator of steel transmission towers, returning to the Bethlehem company in 1909. Mr. Tobias started with the Bethlehem Iron Co. as purchasing agent, having had previous experience with the Long Island Railroad.

Construction Work Declined During June

Construction contracts awarded in the territory east of the Rocky Mountains during June amounted to $545,891,100, states the F. W. Dodge Corporation. This represents a decline of 7 per cent compared with the preceding month, but is modified by the fact that the normal seasonal decrease is 6 per cent. The total for June shows a falling off of 16 per cent compared with the corresponding month of 1928.

Despite the general decline, several districts reported encouraging developments. In the Middle Atlantic States new building and engineering work in June totaled 7 per cent more than in May, and in the Southeastern States the volume was 24 per cent greater than in May and 36 per cent greater than in June, 1928. In the Northwest (Minnesota, the Dakotas and northern Michigan) construction contracts, although showing a decline from May, were 44 per cent more in June than in the same month last year and work begun in the first six months of 1929 was 38 per cent greater in volume than in the first half of 1928.

International Statistical Bureau Suggested

Desirability of creating an agency to gather and disseminate international industrial statistics was emphasized by Magnus W. Alexander, president National Industrial Conference Board, New York, in an address delivered before the International Chamber of Commerce on July 9, at Amsterdam, The Netherlands.

Mr. Alexander pointed out the need in each country, unless the situation is already adequately met, of a national private organization to assemble and interpret economic statistics of various industries and to coordinate them into a comprehensive "intelligence service" for the nation as a whole, cooperating at all times with the statistical services of the Government and of other bodies and thus benefiting from them. "Such national agencies, similar in organization and using similar procedure, methods and nomenclature, would be in a position to supply promptly the comparable and authentic information needed for the development of current, comprehensive, international industrial statistics."

In each country associated in such an effort, stated Mr. Alexander, "a patient and persistent educational process will be needed to teach business not only the value of comprehensive trade statistics, but also that they will be of no value if they are treated in a spirit of secrecy and individual unrest as a weapon against others, rather than as a tool with which all may work together. If the development of statistics of industry in the United States may be briefly characterized, it may be said that they have ceased to be a by-product of business, and have become one of its potent instruments."

Governmental agencies cannot secure sufficiently comprehensive information to supply the requirements for business guidance without the prior development of such information through private cooperative effort, or without a system of machinery so costly and elaborate as to be out of proportion to the value of the results, stated Mr. Alexander. However, it would seem that one of the valuable services that government can render is to record and disseminate information gathered through private cooperative effort. The greatest service government can give is to stimulate such effort and to aid it in various ways.

Smaller Stocks of Industrial Coal on Hand

Industrial stocks of bituminous coal as of June 1 are estimated by the National Association of Purchasing Agents as being equivalent to 25 days' supply at current rates of consumption. This compares with 27 days' on May 1. By industries, the stocks include: 17 days' supply for by-product coke plants; 51 days' for electric utilities and coal gas plants; 21 days' for railroads; 25 days' for steel mills and 27 days' for other industries.

Estimated industrial consumption in May was 37,298,000 net tons, which is a reduction of something more than 1 per cent from April consumption and, with the exception of January, the smallest total since November. Industrial stocks are figured at 31,282,000 tons on June 1, compared with 33,468,000 tons a month earlier. The latest figure is much the smallest in more than a year. It compares with 40,890,000 tons on June 1, 1928.

Factory Wages Remain High

Average weekly earnings in representative New York State factories were $30.03 in May, according to a report of the State Industrial Commissioner. While this is below the $30.07 of April and the $30.35 of March, it is otherwise, with the exception of last December, the highest monthly average ever reached. It compares with $29.19 in May, 1928, and practically the same amount the year before.

Ingot Brass June Prices

CHICAGO, June 29.—The Non-Ferrous Ingot Metal Institute reports the average prices per pound received by its membership on commercial grades of the six principal mixtures of ingot brass during the 28-day period ended June 21. As there are, as yet, no generally accepted specifications for ingot brass, it must be understood that each item, listed below, is a compilation representing numerous sales of metal known to the trade by the designation shown, but each item in reality including many variations in formulas. Until the program of standardizing the principal specifications, now progressing in cooperation with the American Society for Testing Materials, is completed, the following specifications will be understood to refer to "commercial grades":

Commercial 80-10-10 (1 per cent impurities)	17.309c.
Commercial 78 per cent metal	15.45c.
Commercial 81 per cent metal	15.616c.
Commercial 83 per cent metal	16.024c.
Commercial 85-5-5-5	16.331c.
Commercial No. 1 yellow brass ingot	13.515c.

Sheet and Tin Mill Wages Up for July-August

For July-August, tonnage rates paid to sheet and tin mill workers in mid-Western mills operating under the sliding scale wage agreement of the Amalgamated Association of Iron, Steel & Tin Workers, advance to 27 per cent above base, from 25½ per cent, paid in May-June. The increase follows an increase in the average selling price of Nos. 26, 27 and 28 gage black sheets shipped during the 60 days ended June 30, to 3.05c. a lb., from 3c., the average disclosed two months before. The examination of sales sheets and the settlement were conducted last week at Youngstown, at the office of Elias Jenkins, secretary of the Western Sheet and Tinplate Manufacturers Association.

Production and Shipment of Raw Materials and Finished Products in June

	June, 1929	May, 1929	June, 1928
Railroad locomotives shipped (a), number	78	99	51
Total, 6 months (a)	319	...	314
Exports in 6 months (a)	39	...	23 (b)
Unfilled orders, end of month (a)	552	444	201
Bituminous coal mined (c), net tons	37,900,000	40,172,000	35,963,000
Anthracite mined (c), net tons	5,015,000	6,308,000	5,301,000
Beehive coke (c), net tons	600,200	597,400	301,600

(a) Department of Commerce.
(b) Includes two electric units.
(c) United States Bureau of Mines.

Output Higher in Britain and Germany

British Pig Iron Production Increased—German Steel Tonnage Highest Since War—Japan Has Increasing Demand

(*By Cable*)

LONDON, ENGLAND, July 8.

CLEVELAND pig iron prices are strong as a result of the shortage of supplies and makers are not accepting last quarter business. Merchant sellers of pig iron are obtaining 1s. (24c.) a ton more than the minimum prices for any available small lots.

Output is expected to be increased by blowing in four more furnaces before the end of August, as local ore and coke production is being increased.

Belgium and Italy have bought further tonnages of hematite iron and domestic consumers are also active.

New business in finished steel is moderate, but specifications against current contracts are coming in more freely and consumers are pressing for larger supplies, especially of ship material, before the Scottish plants begin their holidays on July 11. The South Durham Steel & Iron Co., Ltd., is resuming operation of its Stockton-on-Tees plate mill, after more than 12 months of idleness.

Continental iron and steel business here is quiet, consumers displaying only a meager interest, especially in semi-finished material. Continental mills now need orders and quotations are inclined to recede, except on plates and shapes.

Tin plate inquiry is well maintained, but business is inactive, as consumers are uncertain of the trend of prices. Mills needing orders have accepted less than 18s. 3d. ($4.42) per base box, f.o.b. works port, to fill gaps in their schedules, but others prefer to suspend operations and draw the under-production payments from the association. Output probably will be further reduced under the restriction plan, so that the market should respond quickly to any heavy buying movement.

Galvanized sheets are quiet and mills are in need of orders. Japan has bought a few small lots of heavy and light-gage black sheets.

Clyde shipbuilding output in June was 31 vessels of 49,000 tons.

Steel Cartel Agreement May Be Renewed

Prospects Improve for Continuing European Association, Although Participation Quotas May Be Changed

BERLIN, GERMANY, June 24.—The prospect for a renewal of the International Steel Cartel after October has improved. At the Paris meeting last week it was agreed in principle that renewal was desirable, but no formal agreement as to the conditions is likely to be reached before the September meeting, to be held in Vienna.

The German group's proposals, as was foreseen, contained a demand that participation quotas shall be re-fixed upon the basis of actual production during the past few years. The exact amount of the quotas would depend upon what period is chosen as the basis for the production figures. Germany's expectation is that its quota of 43.25 per cent will be raised by another five points. The West European groups are understood to oppose the German demand.

Germany's other demand is that the restriction of its export to 330,000 tons a month shall be abolished, or that there shall be export restriction for all countries. This demand has not been considered.

Against the renewal of the International Cartel still stands the obstacle that no progress has been made toward renewing the native German syndicates. At Paris the cartel decided to increase the total production program by 1,000,000 tons to 32,295,770 tons a year. This holds good for the third quarter of 1929 and thereafter unless altered. The effect is to increase Germany's penalty-free quota by approximately 430,000 tons a year.

British and Continental European Export prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.58	to	$17.82
East Coast Hematite	3	14½	to	3	15	18.06	to	18.18
Ferromanganese, export	14	0				67.90		
Billets, open hearth	6	10	to	6	12	31.52	to	32.12
Sheet bars, open hearth	6	10				31.52		
Black sheets, Japanese specifications	13	5				64.26		
Tin plate, per base box	0	18¼	to	0	18½	4.42	to	4.48
Rails, 60-lb. and heavier	7	15	to	8	15	37.59	to	42.43
						Cents per Lb.		
Steel bars, open hearth	7	15	to	8	10	1.67	to	1.84
Beams, open hearth	7	2½	to	7	12½	1.55	to	1.65
Channels, open hearth	7	7½	to	7	17½	1.60	to	1.71
Angles, open hearth	8	2½	to	8	12½	1.76	to	1.86
Ship plates, open hearth	7	12½	to	8	2½	1.66	to	1.76
Black sheets, No. 24 gage	10	5	to	10	10	2.21	to	2.27
Galvanized sheets, No. 24 gage	13	7½	to	13	10	2.90	to	2.92

Continental Prices F. O. B. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	10s	to	£3	14½s.	$16.97	to	$18.06
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3	12				17.45		

Billets, Thomas	5	2	to	5	6½	24.73	to	25.82
Sheet bars, Thomas	5	6½	to	5	7	25.82	to	25.94
Wire rods low C., No. 5 B.W.G.	6	5	to	6	6¼	30.31	to	30.61
Black sheets, No. 31 gage, Japanese	12	10				60.62		
Rails, 60 lb. and heavier	6	10*				31.52		
Rails, light	6	1½				29.46		
						Cents per Lb.		
Steel bars, merchant	5	16½	to	5	18	1.28	to	1.30
Steel bars, deformed	5	16	to	5	17	1.27	to	1.29
Beams, Thomas, British standard	5	5	to	5	9½	1.13	to	1.14
Channels, Thomas, American sections	6	1				1.33		
Angles, Thomas, 4-in. and larger, over ⅝-in. thick	5	8				1.13		
Angles, Thomas, 3-in.	5	18				1.30		
Ship plates, open-hearth, inspected	7	10				1.62		
Hoop and strip steel, over 6-in. base	6	2½				1.35		
Wire, plain, No. 8 gage	7	10				1.62		
Wire, galvanized, No. 8 gage	9	10	to	9	12½	2.06	to	2.12
Wire, barbed, 4-pt. No. 12 B.W.G.	12	0½				2.60		
Wire nails, base	8	0½				$1.74	per keg	
Wire nails, assortments, 1 to 6-in., keg	10	9				2.26		

*Open-hearth steel, 10s. ($2.42) per ton extra.

Germany's objection to the 330,000-ton a month limitation of exports has of late increased, owing to the fact that the proportion of its foreign to home orders is steadily rising.

The International Wire Rods Cartel has not yet been renewed. At the last meeting in Berlin in April renewal was agreed upon in principle, but Germany made certain reservations, including a right to withdraw if the native Ingot Steel Syndicate and the other native syndicates are not renewed. A revision of quotas all around is demanded. Germany's competitors complain that it has of late much exceeded its quota, and Germany in turn complains that its quota is based on production in 1926, a very bad year for the whole iron and steel industry. The revival of the International Wire Cartel, which was at one time considered a condition precedent to the renewal of the Wire Rods Cartel, has not been negotiated.

Czechoslovakian Wire Mills Seek Larger Export Trade

HAMBURG, GERMANY, June 21.—Competition in wire and wire products for export is expected to increase considerably as a result of efforts by the Czechoslovakian wire mills to secure a larger share of the trade. At a recent meeting in Prague, the mills pointed out that the Czechoslovakian domestic market would be unable to absorb the same tonnage of wire and wire products as last year and that the surplus must be sold for export. The mills are well equipped with modern machinery and wages are 45 to 50 per cent of the German scale. Continental agents for Czechoslovakian mills are offering galvanized wire, plain and barbed, and wire nails at low prices, which are expected to bring about a further reduction in the export quotations by other wire producing countries.

Krupp Grants Rebates on Nirosta Steel

HAMBURG, GERMANY, June 24.—The Krupp Co. has granted a considerable rebate to the German cutlery industry on purchases of Krupp Nirosta steel when used to manufacture cutlery for export. This will enable the German cutlery industry to reduce its export prices.

Belgian Production in May

BERLIN, GERMANY, June 26.—Belgium's production in May was: Pig iron, 348,400 tons as against 336,110 tons in April; steel ingots, 330,600 tons against 332,020 tons; rolling-mill products, 298,800 tons against 300,340 tons.

Orders are in satisfactory volume and prices are firm without, however, any marked rising tendency. English competition in pig iron has weakened.

German Steel Output Highest Since War

Confidence Returning Following Reparations Agreement—Export Trade Reported Very Favorable

BERLIN, GERMANY, June 24.—The increase in steel production, which began in March, continues. The May output was the highest for any month since the war. The increase was almost entirely in structural shapes and railroad permanent way materials, sales of which in May were between 50 and 200 per cent higher than in February. According to the Ingot Steel Syndicate's returns, the output of all steel is now around 5 per cent higher than the combined quotas of member firms, whereas in February it was 7 per cent below. Orders on the books are still increasing. Production figures are:

	1929	1928
Ingots:	Metric Tons	
May	1,421,047	1,250,256
January-May	6,892,882	6,627,696
Rolled Products:		
May	959,090	897,204
January-May	4,697,514	4,717,503

The general business situation has improved. The reserve shown by manufacturers during the period of uncertainty as to the outcome of the Paris reparations conference has given way to a feeling of confidence. This feeling is strengthened by the fact that in May, for the first time since 1926, the foreign trade balance was favorable.

Much of Germany's recent export steel business has come from England. French and Belgian producers were unable to sell, owing to their large home consumption, and England became increasingly dependent on Germany.

Of the steel market as a whole, authorities speak optimistically. The fact that the monthly average of ingot output so far this year has exceeded that of the boom year 1927 is considered proof that the steel-consuming industries are doing well. Further, the foreign demand for German machinery and for other steel and iron wares continues to increase, and at the same time the practical cessation of borrowing from abroad tends to check imports.

Change in German Steel Shipments to America

HAMBURG, GERMANY, June 24.—The German steel industry, which this year was leading in the export shipment of finished steel products to the United States, reports a change in the forms of steel shipped there. Formerly the shipments were principally structural shapes, plates and other construction material, whereas now the shipments are mostly tubing, cold-rolled strips and bars for the production of bolts, nuts and rivets.

Polish Competition May Be Factor in Steel Exports

HAMBURG, GERMANY, June 24.—In German steel trade circles the establishment of the Consolidated Silesian Steel Corporation is regarded with much interest. Through the organization of this company, the amalgamation of Upper Silesian steel works has been accomplished, and it is supposed in German steel circles that one of the first steps of this company will be to foster export business.

Poland offers special opportunities for a strong financial group to build up a remunerative export trade. Wages and transportation costs are low and the Government is facilitating the building up of export trade. Moreover, shipping facilities from Danzig have been greatly improved in recent years.

Lack of funds for modernization and export organizing has so far made it impossible for Poland to build up a large export business. An extension of sales in Poland is hardly possible, because the domestic Poland market will for some time be small. Therefore the expansion program will certainly be started with a view to selling steel abroad. It must be remembered that the Polish industry, which is now virtually under the control of the Harriman group of New York, is not a member of any cartel except the tube cartel, and, as an outsider, is in a unique position to improve its situation very much. There is little doubt in Continental export circles that the Polish competition will soon be strongly felt.

Japan's Sheet Requirements About 225,000 Tons

YOKOHAMA, JAPAN, June 15.—It will be necessary to import about 78,600 tons of light-gage black sheets, 13 to the bundle, during the present year according to certain large Japanese sheet consumers. This estimate is based on a yearly demand in Japan for 160,000 metric tons of galvanized sheets of light gage, 30,000 tons of sheets used in the manufacture of enameled and other kitchen ware and exports of about 35,000 tons of galvanized sheets, a total of about 225,000 tons. Japanese domestic output of light-gage sheets, which has increased in recent months, is about 146,400 metric tons, of which 110,000 tons is produced by the Kawasaki Dockyard Co., Kobe, 10,000 tons by the Nakayama Sheet Mfg. Co., 24,000 metric tons by the Government Steel Works and 2400 tons by the Nippon Kogyo Kaisha.

German Thin-Sheet Makers Combine

New Domestic Sales Agreement Believed to Provide Basis for Establishment of Thin-Sheet Syndicate

HAMBURG, GERMANY, June 15.—The Feinblechkontor G.m.b.H., with headquarters in Cologne, which has been formed by light gage sheet producers, includes in its membership the Vereinigte Stahlwerke A. G., Düsseldorf, and Otto Wolff & Co., Cologne. Hereafter it will be the exclusive sales agency in the German domestic market for thin sheets.

The sheet mills controlled by these two companies are the August Thyssen Hütte, Niederrheinische Hütte, Hoerder Verein, Huestener Gewerkschaft, Westfälische Union in Nachrodt, Meggener Walzwerke, Eichener Walzwerk, Walzwerk Weidenau, Sieghutter Eisenwerk, Schleifenbaum & Mattner in Siegen, Von der Zypen-Wissen, Bonzel & Co. in Olpe, Heggener Walzwerk in Heggen, Stahlschmidtsche Werke in Kreuzthal, Bruchs Wwe. in Weidenau, Rasselsteiner Eisenwerk Gesselschaft in Neuwied-Rasselstein. These mills produce about 50 per cent of all light gage steel sheets in Germany.

The new association is considered to have established a good basis for the formation of a thin sheet syndicate. The important outsiders producing light gage sheets include the Ohler Eisenwerke at Ohle, Storch & Schoenberg A. G., Geisweid, which is controlled by the Mannesmann interests, Bergbau und Hütten A. G., Friedrichshütte, controlled by Friedrich Thyssen & Co., Geisweider Eisenwerke A. G., controlled by the Thyssen and Kloeckner interests, Eisenwerk Gesselschaft Maximilianshütte in Rosenberg, Eisenhüttenwerk Thale at Thale, Capito & Klein A. G., at Benrath, controlled by the Krupp interests, Stahl und Walzer Hennigsdorf A. G., controlled by the Mitteldeutsche Stahlwerke A. G. and the Allgemeine Electricitäts Gesellschaft and the Eisen und Hüttenwerke A. G. in Bochum.

Japan Increasing Indian Pig Iron Imports

YOKOHAMA, JAPAN, June 15.—It is estimated that about 500,000 tons of Indian pig iron will be imported by Japanese consumers this year. In March, arrivals totaled 40,568 tons from Calcutta, bringing the imports for the first three months of this year to 118,035 tons, or 42,233 tons more than in the first quarter of 1928. At this rate, the total of imports should be close to 500,000 tons, about 150,000 tons more than last year. Domestic pig iron producers are seeking an adequate method of preventing such heavy importation of iron, and may find it necessary to reduce their quotations drastically to meet this competition.

Canadian Iron and Steel Output Up in May

TORONTO, ONT., July 5.—May coke pig iron output in Canada was 81,464 gross tons, an increase of 3 per cent over the 79,341 tons produced in April of this year, but 7 per cent under the total of 87,811 tons reported for May a year ago. The number of blast furnaces blowing on May 31 remained at six, the same number as on April 30. Active furnaces had a daily capacity of 2475 tons per day, or 60 per cent of the total capacity of all blast furnaces in Canada.

Since the first of June the Canadian Furnace Co., Port Colborne, Ont., blew in its Victoria furnace, with a capacity of 500 tons per day.

For the five months ended with May pig iron production amounted to 428,684 tons, as compared with 370,634 tons for the corresponding period of 1928, and 334,276 tons produced during the first five months of 1927.

Production of ferroalloys during May at 6351 tons was 11 per cent over the 5744 tons reported for April. Total production for the five months ended with May was 30,332 tons, as compared with 21,857 tons during the same five months of last year.

Output of steel ingots and direct steel castings during May amounted to 126,372 tons, as compared with 122,102 tons of April and 117,655 tons in May, 1928. As compared with figures for April, production for the month under review shows a gain in steel ingots to 120,015 tons, compared with 115,882 tons in the previous month, and an increase in steel castings to 6367 tons, compared with 6220 tons of April.

For the five months of this year the production of steel ingots and castings amounted to 619,337 tons, an increase of 17 per cent over the 631,808 tons of the corresponding period last year, and 45 per cent greater than the 427,370 tons produced in the first five months of 1927. This year's output includes 590,259 tons of steel ingots and 29,078 tons of direct steel castings.

Kawasaki Company's Large Sheet Bar Capacity

According to A. Cameron & Co., Kobe, Japan, the market for black sheets is depressed with prices continuing downward. By the end of June the Kawasaki Dockyard Co. at Kobe, the largest black sheet mill in Japan, is expected to be producing, with its new mills, 200,000 tons of sheet bars and 150,000 tons of black sheets a year. Imports of black sheets in April totaled 6143 metric tons, of which 3710 tons came from the United Kingdom, 1510 tons from Germany, 830 tons from the United States and 93 tons from other countries.

Congress of Metallurgists in Germany

The forthcoming congress of metallurgists to be held in Düsseldorf, Germany, Sept. 9 to 12, promises to be extraordinarily interesting. The congress will comprise the presentation and discussion of about 15 scientific and practical papers relating to metallurgical work; visits to works in or near Düsseldorf and Berlin, and receptions and other social functions.

G. Shaw Scott, 36 Victoria Street, London, S.W.1., is secretary of the Institute of Metals, under which the congress is to be held.

German Foreign Trade in Iron and Steel

(In Metric Tons)

Item	Exports April	Exports May	Imports April	Imports May
Pig iron and ferroalloys	35,904	44,275	12,729	11,495
Ingots, blooms and billets	68,157	52,795	7,653	8,045
Iron and steel bars, rods, angles	139,447	128,181	49,956	57,837
Structural shapes	8,093	10,868	313	691
Hoops and bands	19,689	14,936	6,492	7,313
Plates and sheets	58,985	68,840	5,011	6,565
Galvanized sheets	2,318	2,464	499	239
Tin plate	4,542	4,271	1,857	2,481
Cast iron pipe	11,120	14,952	5,962	6,918
Wrought iron pipe	42,636	38,411	2,615	2,888
Pipe fittings	4,587	4,773	77	95
Rails	44,268	48,147	12,068	8,591
Other railroad material	10,715	10,835	808	1,064
Plain wire	65,262	44,731	8,122	7,660
Barbed wire	7,058	5,635	369	293
Wire rope	1,629	1,439	90	116
Wire cloth	2,684	2,495	4	3
Other wire manufactures	905	840	69	78
Nails, tacks, rivets and washers	11,171	10,806	159	304
Castings and forgings	21,569	20,939	2,625	2,880
Other iron and steel manufactures	4,680	4,192	1,152	1,150
Total	565,419	534,825	118,630	126,766

From Bureau of Foreign and Domestic Commerce, Washington.

Machinery Markets and News of the Works

Tool Demand Declines

Holiday and Usual Seasonal Letup in Buying Are Responsible for Lessened Bookings

DEMAND for machine tools tapered off somewhat the past week on account of the Fourth of July holiday, together with the usual seasonal decline. The New York district, however, proved an exception, with the volume of sales holding up remarkably well.

Business continues to come from widely diversified classes of users for one or more machines each. For example, orders in the past week were placed by manufacturers of such varied lines as printing machinery, electric lamps, reduction gears, motor trucks, airplanes, conveying equipment, automobile trunks, steel, radios and ball bearings.

In some lines of tools, deliveries have improved, but many builders report the situation unchanged, with deliveries long deferred.

The Amtorg Trading Corporation, New York, is now inquiring for equipment for a large tractor plant to be built in Russia. Purchases are expected to include 15 to 20 turret lathes.

Inquiries from the Cleveland Union Terminals Co., listing 25 tools, and from the United States Air Corps, Dayton, Ohio, for seven lathes, are still pending.

Machine tool plants have accumulated enough orders in the past few months to operate at a high rate during July and August, even if bookings should decline considerably in the near future, a development which is not expected.

New York

NEW YORK, July 9.—Machine tool business in the first week of July has held up remarkably well. The holiday last week did not make the difference in the volume of orders that might have been expected. Orders are coming from widely diversified classes of users. For example, last week business was placed by such varied lines of manufacture as printing machinery, electric lamps, reduction gears, motor trucks, airplanes, conveying equipment, automobile trunks, steel, radios, ball bearings. While there was no outstanding buying, some orders called for two or three machines.

Ingersoll-Rand Co., 11 Broadway, New York, manufacturer of air compressors, rock drills, pumps, etc., has plans for one-story addition to Cameron plant at Phillipsburg, N. J., totaling about 36,000 sq. ft. floor space. A two-story unit, 40 x 140 ft., will also be erected for office and operating service. Entire expansion will cost over $100,000 with equipment.

Department of Parks, Arsenal Building, Sixty-fourth Street and Fifth Avenue, New York, W. R. Herrick, commissioner, will soon ask bids for a power house and service building, to cost more than $125,000 with equipment. Trowbridge & Livingston, 527 Fifth Avenue, are architects.

Metropolitan Engineering Co., 1250 Atlantic Avenue, Brooklyn, manufacturer of protective equipment and devices, has awarded general contract to S. F. Musselwhite, 806 St. Johns Place, for two-story plant unit, to cost about $45,000 with equipment. E. W. Helms, 88 Lexington Avenue, New York, is architect.

General Gas & Electric Corporation, 50 Pine Street, New York, operating electric light and power properties, has arranged for a preferred stock issue to total $23,750,000, part of proceeds to be used for expansion. Lexington Water Power Co., a subsidiary, has work under way on a hydroelectric power project on Saluda River, near Columbia, S. C., to cost more than $15,000,000 with transmission system.

Superior Fireproof Door & Sash Co., 1811 Carter Avenue, New York, manufacturer of metal-covered sash, doors, etc., will proceed with superstructure for a two-story plant, 100 x 200 ft., to cost about $140,000 with equipment. H. Ginsberg, 205 West Forty-second Street, is architect.

Moto-Meter Gauge & Equipment Co., 11 Wilbur Avenue, Long Island City, manufacturer of automobile accessories, is said to be planning an addition to cost over $50,000 with equipment.

New York Central Railroad Co., 466 Lexington Avenue, New York, will develop plans for electrification of west side freight line from Seventy-second Street to Spuyten Duyvil, and has been granted until January, 1931, to finish project. Engineering department is in charge.

Long Island Lighting Co., 50 Church Street, New York, operating electric light and power properties on Long Island, is arranging for a preferred stock issue to total $4,000,000, part of proceeds to be used for expansion.

Pioneer Instrument Co., 754 Lexington Avenue, Brooklyn, manufacturer of aviation flight and other navigation instruments, has awarded general contract to R. J. Murphy, Inc., 55 West Forty-second Street, New York, for addition to plant, including improvements in present factory to cost about $60,000 with equipment. Ralph H. Segal, 475 Fifth Avenue, New York, is architect. Company has been merged with Bendix Aviation Corporation, South Bend, Ind., affiliated with Bendix Brake Co., same address, and will be operated as unit of that organization. Further expansion is planned. Bendix company has also secured Eclipse Machine Co., 545 North Arlington Avenue, East Orange, N. J., manufacturer of starting equipment, generators, etc., for aircraft.

Brunswick Laundry, 222 Tonnele Avenue, Jersey City, N. J., will soon take bids for power house addition, 85 x 100 ft., installation to include a 500-hp. boiler unit with accessories, 600-kw. engine-generator, and auxiliaries. P. Simeone & Co., Inc., 22 Journal Square, is architect and engineer.

Elizabeth Iron Works, Inc., 137 Franklin Street, Elizabeth, N. J., is planning establishment of new iron and steel fabricating plant to cost about $40,000 with equipment. Present works will be removed to new location and capacity increased.

Lubrication Purification Sales Co., Third and Creek Streets, Long Island City, manufacturer of lubricating devices and equipment, has purchased property on Kings Wood Road, Weehawken, N. J., and is reported planning new factory to cost over $45,000 with equipment.

Board of County Freeholders, Morristown, N. J., has purchased property, 75 x 250 ft., improved with one-story building, at Mendham, for central machine and repair shop, and storage plant for road machinery and other equipment. Additional buildings are planned.

Newhall Chain Forge & Iron Co., 9 Park Place, New York, has purchased chain shop and other buildings of Rensselaer Chain Works, Rensselaer, N. Y. Rensselaer chain shop has been operated by Newhall company for several years. Newhall Chain Forge & Iron Co. is a division of Henry B. Newhall Corporation, Garwood, N. J., other divisions being Diamond Expansion Bolt Co. and New Jersey Foundry & Machine Co.

Charles Ahr Co., Inc., Lincoln, N. J., has been incorporated and will continue manufacture of forged products formerly made by Charles Ahr. F. P. MacKay is secretary-treasurer.

Buffalo

BUFFALO, July 8.—Firestone Tire & Rubber Co., Akron, Ohio, has plans for a three-story and basement factory branch and distributing plant at Buffalo, to cost about $150,000 with equipment. Lockwood, Greene Engineers, Inc., Hanna Building, Cleveland, is architect and engineer.

A. O. Fleet, Buffalo, will establish a new welding shop at 1681 Fillmore Avenue.

Lionite Abrasive Co., a subsidiary of General Abrasive Co., Niagara Falls, N. Y., has acquired 8-acre tract at Niagara Falls, Ont., and plans construction of new plant to cost over $100,000 with equipment. Allen V. Parker is president of Lionite organization.

John P. Todd, 1105 East Genesee Street, Syracuse, N. Y., and associates have organized Twentieth Century Aircraft Corporation, and plan early operation of local plant to manufacture airplanes and parts.

Universal Wireless Communication Co., Liberty Bank Building, Buffalo, William H. Fitzpatrick, chairman of board, will soon take bids for first unit of a radio transmitting station at Akron, N. Y., including steel towers, power plant, etc., to cost over $75,000. G. Morton Wolfe, 1377 Main Street, Buffalo, is architect.

Philadelphia

PHILADELPHIA, July 8.—Bids will be asked at once by United Motors Service, Inc., 342 North Broad Street, Philadelphia, subsidiary of General Motors Corporation, Detroit, for two-story service, repair and sales building, to cost over $150,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Quaker City Iron Works, Tioga and Richmond Streets, Philadelphia, has acquired property, 200 x 353 ft., on Ontario Street, and 25 x 253 ft., on Tioga Street, for expansion.

Wilkening Mfg. Co., Fifteenth Street and Mount Vernon Avenue, Philadelphia, manufacturer of piston rings, radio equipment, etc., has awarded general contract to France & Messar, Inc., 6725 Yocum Street, for one-story addition, to cost about $25,000.

Atwater Kent Mfg. Co., Philadelphia, manufacturer of radio equipment and parts, has filed plans for a one-story and basement power plant, arranged in two units, 66 x 96 ft. and 60 x 71 ft., to cost about $250,000 with equipment. Ballinger Co., Twelfth and Chestnut Streets, is architect and engineer.

William M. Connery, president of Connery & Co., Second and Luzerne Streets, Philadelphia, manufacturer of boilers, tanks, etc., and associates have organized Connery Clarifying Equipment Co., a subsidiary, to manufacture iron and steel tanks and kindred equipment for clarifying and distilling oils and other solvents. Mr. Connery will be president of new organization; Edgar C. Aucott is treasurer.

Wilckes-Martin-Wilckes Co., Fifteenth and Pine Streets, Camden, N. J., manufacturer of lamp black and kindred products, is planning to rebuild part of plant destroyed by fire July 3, with loss reported at $100,000 including equipment. Headquarters are at 135 William Street, New York.

John A. Roebling's Sons Co., Trenton, N. J., manufacturer of wire rope, cables, etc., has awarded general contract to J. W. Ferguson Co., Paterson, N. J., for one-story addition, to cost about $125,000 with equipment.

Philadelphia Electric Co., Tenth and Chestnut Streets, Philadelphia, has plans for new power substations and switching plants at Bristol, Phoenixville and Wyncote, Pa., each to cost about $65,000 with equipment. Work will be carried out under direction of United Engineers & Constructors, Inc., 112 North Broad Street, an affiliated organization.

John F. O'Toole, 1107 Marion Street, Scranton, Pa., and associates have organized Electric City Mfg. Co., and plan early operation of local factory to manufacture electrical appliances and equipment. James J. Wisely, 614 Wheeler Avenue, and John J. Schofield, 1013 Bennett Street, are interested in new company.

Harrisburg Gas Co., Fourteenth Street and Market Square, Harrisburg, Pa., has plans for a one and three-story equipment storage and distributing plant, with repair department, to cost more than $70,000 with equipment. United Engineers & Constructors, Inc., 112 North Broad Street, Philadelphia, is architect and engineer.

The Crane Market

THE Fourth of July holiday was partially responsible for a quiet week in the crane market. The only feature was the purchase of 12 cranes by the Libbey-Owens Sheet Glass Co., Toledo, Ohio. The Bucyrus-Erie Co., Milwaukee, has bought a 20-ton foundry crane and a 7½-ton and a 3-ton crane. Most of the requirements of the Steel Corporation subsidiaries, which earlier in the year were estimated at 40 or more cranes, are yet to be placed. They include 29 cranes for the projected rebuilding of the McKeesport, Pa., plant of the National Tube Co. and a number of cranes for the Pittsburgh and Youngstown district plants of the Carnegie Steel Co. The Gulf States Steel Co., Alabama City, Ala., and the Great Lakes Steel Corporation, Detroit, are expected to buy cranes soon. Crane builders are busy and indications point to a continuance of this condition for the next three months or longer. Deliveries are reported to be more extended than a few weeks ago.

Recent purchases include:

Libbey-Owens Sheet Glass Co., Toledo, Ohio, 12 cranes from Cleveland Crane & Engineering Co.

Bucyrus-Erie Co., Milwaukee, 20-ton foundry crane and 7½-ton and 3-ton cranes from Milwaukee Electric Crane & Mfg. Corporation.

Taylor Forge & Pipe Works, Chicago, 10-ton magnet crane from Whiting Corporation.

Carnegie Steel Co., 10-ton bucket handling crane for Clairton works from Morgan Engineering Co.

St. Louis

ST. LOUIS, July 8.—Bids will soon be asked by Missouri Pacific Railway Co., Missouri Pacific Building, St. Louis, for new coaling station, storage and distributing plant at Durand, Kan., to cost about $40,000 with conveying, elevating and other equipment. E. A. Hadley is chief engineer.

Kansas City Tank Car Co., Kansas City, Mo., recently organized, has acquired local plant of Mid-Continent Tank Car Co., Tenth and Cherry Streets, for establishment of main works. Plans are under way for extensions, including one-story unit, to cost about $45,000 with equipment.

Board of Education, East St. Louis, Ill., has authorized installation of manual training department in new two and three-story junior high school at Caseyville Avenue and Fortieth Street, to cost over $300,000. W. J. Kennedy, First National Bank Building, East St. Louis, and N. S. Spencer & Son, 180 North Michigan Avenue, Chicago, are associated architects.

J. E. Crosbie, Central National Bank Building, Tulsa, Okla., and associates are said to be planning construction of oil refinery in Cary pool district, Okfuskee County, to cost about $90,000 with equipment.

Board of Trustees, Creighton University, Omaha, Neb., have plans for a new power house, to cost about $100,000 with machinery. L. A. Daly, Peters Trust Building, is architect.

McKecknie & Trask, Board of Trade Building, Kansas City, Mo., architects, will proceed with superstructure for an eight-story and basement automobile service, repair and garage building, to cost over $200,000 with equipment. Frank L. Brown, Orear-Leslie Building, is engineer.

Plant of United Iron Works Co., Iola, Kan., has been purchased by a group of local men who will operate it under name of Kirk-Morrow Iron Works Co. J. B. Kirk will be president.

Pittsburgh

PITTSBURGH, July 8.—While there has been some falling off in machine tool orders the past week, this is regarded merely as seasonal rather than a decline in requirements. More than 25 tools remain to be bought by the Aluminum Co. of America for its New Kensington works, and the Westinghouse Electric & Mfg. Co., has just completed its third quarter machine tool inquiry, which was issued in sections and contains over 100 items. This is easily the largest list the company has put out in recent years and it is interesting to note that some items are included which were originally intended to go into the inquiry for the last quarter of the year.

Deliveries of some classes of tools are not as prompt as at the beginning of the year, and some demands now are developing which call for earlier shipment than manufacturers dare to promise. Quotations are in on a large list for the Christy Park works of the National Tube Co. The Youngstown Sheet & Tube and Republic Iron & Steel companies are expected to be good buyers in the next few months. The steel and metal working industries are providing a good market for machine tools at present.

Contract has been let by Miller Printing Machinery Co., Reedsdale Street, North Side, Pittsburgh, to D. T. Riffle, 1007 Forbes Street, for one and two-story and basement plant unit, 50 x 175 ft., to cost over $70,000 with equipment.

Westinghouse Electric Elevator Co., East Pittsburgh, subsidiary of Westinghouse Electric & Mfg. Co., has purchased plant and business of Norton-Blair-Douglas, Inc., 432 West Forty-fifth Street,

New York, manufacturer of electric and manual door operators, elevator signal systems, etc., and will consolidate. It is proposed to continue acquired plant at present location.

Wilson-Snyder Mfg. Corporation, recently organized as an interest of Oil Well Supply Co., Clark Building, Pittsburgh, to take over and operate Wilson-Snyder Mfg. Co., Braddock, Pa., manufacturer of oil pumping machinery and parts, has disposed of bond issue of $850,000, part of fund to be used for expansion.

Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, has awarded general contract to Public Service Production Co., 80 Park Place, Newark, N. J., for two additions to Newark branch plant, two stories, 81 x 100 ft., and one story 35 x 85 ft., to cost about $150,000 with equipment.

Hunter Steel Co., Pittsburgh, recently organized by A. W. McCandless, 620 Frick Building, and associates, plans operation of local iron and steel plant, primarily for fabricating.

Ruud Mfg. Co., Twenty-ninth and Smallman Streets, Pittsburgh, manufacturer of automatic gas water heaters, parts, etc., has arranged for an additional stock issue to total about $924,000, part of fund to be used for extensions. Work is under way on new two-story building and other facilities, to increase capacity about 20 per cent.

New England

BOSTON, July 8.—The past week was the quietest experienced so far this year by the machine tool trade. The national holiday and the closing of many plants from July 3 until today, with others busy on inventories or repairs, resulted in a marked shrinkage in inquiries. None of the local new tool houses reported any sales of importance. Business in used tools was largely confined to small equipment.

Fafnir Bearing Co., New Britain, Conn., is equipping an addition, and has plans for expansion in a Western subsidiary plant.

Barnum Forge Co., Stratford, Conn., has started work on a one-story forge shop, 60 x 97 ft.

Stamford Hall Sanatorium, North Stamford, Conn., has plans for a power house, 70 x 100 ft., to cost $50,000 with equipment.

Connecticut Power Co., Court and Broad Streets, Middletown, Conn., is revising plans for a two-story service station, 130 x 140 ft.

Taber Cadillac Co., Albany Avenue and Westbourne Parkway, Hartford, Conn., has awarded contract for a service department, 140 x 180 ft.

New England Flexible Door Co., Hartford, Conn., will occupy building of Automatic Refrigerator Co., Capitol Avenue and Laurel Street. Company has been located at Winsted, Conn.

Terry Steam Turbine Co., Windsor Street, Hartford, Conn., has plans for a one-story boiler plant, to cost over $50,000 with equipment. Westcott & Mapes, Inc., 139 Orange Street, New Haven, Conn., is engineer.

Moth Aircraft Corporation, South Lowell, Mass., manufacturer of light aircraft and parts, is considering an expansion program, including new buildings and equipment to double present capacity, to cost over $75,000. Minton M. Warren is president. Company has recently become a unit in Curtiss-Wright Corporation merger of aircraft companies.

Holyoke Water Power Co., Holyoke, Mass., has authorized plans for a new hydroelectric generating plant near mill of American Writing Paper Co., to cost over $100,000 with machinery.

Heald Machine Co., New Bond Street, Worcester, Mass., manufacturer of grinding machines, etc., has awarded general contract to E. J. Cross Co., Worcester, for one-story addition, 105 x 360 ft., to cost $100,000 with equipment.

Central Vermont Railway Co., St. Albans, Vt., has plans for new engine house, with repair facilities, at White River Junction, Vt., to cost about $50,000 with equipment. P. D. Fitzpatrick is chief engineer.

State Airport Commission, Providence, R. I., has authorized purchase of 350-acre tract in Hillsgrove section of Warwick, for State airport and flying field, and will have plans drawn at once for hangars, repair shop, oil storage and other buildings, to cost $145,000 exclusive of land.

J. B. Welch, 44 School Street, Boston, has awarded general contract to Thomas Mulcare, Inc., 66 Western Avenue, Brighton, Mass., for one-story foundry at Cambridge, to cost about $25,000 with equipment.

Rising Paper Co., Housatonic, Mass., has awarded general contract to J. R. Hampson & Co., Inc., 184 North Street, Pittsfield, Mass., for addition to mill at Great Barrington, Mass., to cost over $65,000 with equipment.

South Atlantic

BALTIMORE, July 8.—H. F. Baldwin, 339 St. Paul Street, Baltimore, architect, has asked bids on general contract for a three-story automobile service, repair and garage building, to cost about $150,000 with equipment. Kubitz & Koenig, Emerson Tower Building, are engineers.

Chesapeake & Ohio Railway Co., Richmond, Va., has awarded general contract to John W. Cowper Co., Inc., State Planters' Bank Building, for extensions and improvements in terminal and shops at Hinton, W. Va., to cost about $130,000 with equipment. C. W. Johns is chief engineer.

Continental Can Co., 1 Pershing Square, New York, has purchased plant and business of Eastern Shore Can Co., Hurlock, Dorchester County, Md., and will consolidate. Factory will be continued at present location and plans are under way for expansion.

Pennsylvania Water & Power Co., Lexington Building, Baltimore, is said to have plans for hydroelectric power plant at Safe Harbor, about 9 miles from Holtwood, Pa., to supplement similar generating station and steam power stand-by plant at last noted place, to cost more than $1,000,000.

Air Propellers, Inc., Hagerstown, Md., recently formed by Edwin J. Smead, 1134 Oak Hill Avenue, and associates, plans early operation of local factory to manufacture aircraft propellers and kindred airplane equipment.

Flintkote Co., Park Square Building, Boston, manufacturer of roofing products, has arranged for purchase of Atlanta plant of Logan-Long Co., Chicago, manufacturer of kindred specialties, and will take immediate possession. New owner will continue operation as a factory branch and plans expansion. C. E. Rahr is president of purchasing company.

American Oil Co., American Building, Baltimore, has revised plans for a new storage and distributing plant at Atlantic City, N. J., to cost about $80,000 with equipment. Company will also construct two new units at similar plant at Liberty Heights, Baltimore, to cost about $30,000 with equipment. T. J. O'Connell is company architect and engineer.

City Council, Concord, N. C., is asking bids until July 16 for equipment for municipal waterworks, including steel water tank and tower, electrically operated pumping machinery and auxiliary equipment.

Claude Neon Southern Corporation, Atlanta, Ga., has been organized to take over and consolidate Claude Neon Lights, Inc., Atlanta; Munn Sign & Advertising Co., Atlanta; and Elliott Claude Neon Lights of Florida, Inc., Miami and Tampa, Fla., all specializing in manufacture of electric signs and displays. Plans are in progress for expansion, including extensions in Munn plant at Atlanta, and establishment of new plants in Alabama and North and South Carolina. Miami and Tampa plants will be continued with increased production facilities. Entire program will cost more than $350,000. New company will be affiliated with Claude Neon Lights of New York, Inc., 50 East Forty-second Street, New York. R. L. Kester, Jr., vice-president of last noted, will be president of Southern organization; E. Frank Munn, Atlanta, heretofore president of Munn Sign & Advertising Co., will be vice-president.

Birmingham Machine & Foundry Co. and Joubert & Goslin Machine & Foundry Co., Birmingham, both engaged in manufacture of sugar mill machinery, have been consolidated as Goslin-Birmingham Mfg. Co.

Chicago'

CHICAGO, July 8.—Sales the past week were in small volume, but in view of the amount of business in sight, dealers are inclined to account for this because of the holiday rather than as an indication of a sharp recession in the market. Inquiries before the trade bulk large and foreshadow a fair volume of sales in the coming months.

A buying program by one large farm machinery manufacturer is rapidly taking form. Generally, however, farm implement producers are moving with greater caution. Radio manufacturers are nearing the end of equipment purchases for fall production schedules. It is reported that a Western motor car builder is preparing to enter the market for a large number of machine tools. Deliveries are slowly improving. Demand for used tools is lighter but the supply is short and few prospective buyers are able to fill their needs.

R. C. Lydy, 205 West Wacker Drive, Chicago, will build a two-story garage, 101 x 181 ft., to cost $150,000.

Peoples Gas, Light & Coke Co., 122 South Michigan Avenue, Chicago, will build a steel gas holder, 123 ft. in diameter, to cost $123,000.

Western Electric Co., Hawthorne Station, Chicago, will erect a one-story addition, 91 x 120 ft., to cost $65,000. C. B. Barnes, Hawthorne Station, is architect.

Carlson Forging Co., 727 Fulton Street, Chicago, is erecting a plant unit to cost

$75,000. G. Kehl Sons have the general contract.

Englander Bed Spring Co., Fortieth Street and Low Avenue, Chicago, was partly destroyed by fire June 28, with loss estimated at $250,000.

Klein Mfg. Co., Burlington, Iowa, manufacturer of poultry equipment and hardware, is erecting an addition, 108 x 160 ft., to cost $30,000. About $10,000 will be expended for machinery and other equipment.

Kewanee Mfg. Co., 401 Tremont Street, Kewanee, Ill., manufacturer of laboratory furniture and other metal equipment, has taken bids on general contract for a one-story addition, to cost about $60,000 with equipment. Frank D. Chase, Inc., 720 North Michigan Avenue, Chicago, is architect and engineer.

Buda Co., Harvey, Ill., manufacturer of railroad equipment and supplies, engines etc., has awarded contract to Austin Co., Cleveland, for one-story addition, to cost about $35,000.

Ruth Automatic Garage, Inc., 38 South Dearborn Street, Chicago, has awarded general contract to J. B. French Co., 30 North Michigan Avenue, for multi-story service, repair and garage building, to cost about $800,000 with equipment. A. S. Graven, Inc., 100 North La Salle Street, is architect.

International Harvester Co., 606 South Michigan Avenue, Chicago, has awarded general contract to G. E. Larson, Carver Building, Fort Dodge, Iowa, for one and three-story factory branch and distributing plant at Fort Dodge, to cost $160,000 with equipment. W. D. Price is superintendent of construction, in charge.

Chamber of Commerce, Cedar Rapids, Iowa, has approved plans for buildings for municipal airport, including hangar, machine and repair shop, and other structures, to cost about $50,000 with equipment. Earl Muzzy is chairman of committee, in charge.

Gardner-Denver Co., East Thirty-ninth Avenue, Denver, manufacturer of rock drills, mining machinery, etc., has authorized a one-story addition to branch plant at Quincy, Ill., totaling 40,000 sq. ft. floor space, to cost more than $100,000 with equipment.

Kunzel-Lenz Electric Mfg. Co., 1751 North Western Avenue, Chicago, has plans for a one-story addition, to cost about $40,000 with equipment. Zimmerman, Saxe & Zimmerman, 212 East Superior Street, are architects.

Board of Education, Quincy, Ill., is considering installation of manual training equipment in new high school, to cost $500,000, for which bids will be asked on general contract in about 30 days. Behrensmeyer & Haffner, W. C. U. Building, are architects.

Cleveland

CLEVELAND, July 8.—While demand for machine tools continues to taper slowly, business is still good. More seasonal slowing down in orders is looked for this month and during August. Deliveries of some lines have improved but on others show no appreciable change. Business is well diversified, although little is coming at present from the automotive industry. There is still a fair amount of buying by the airplane industry.

Definite inquiries have come through the Amtorg Trading Co., New York, for machine tool equipment for a large tractor plant to be built in Russia. Requirements will include 15 to 20 turret lathes. No new domestic inquiries of any size came out during the week. Lists of the Cleveland Union Terminals Co., containing 25 machines, and the seven lathes inquired for by the United States Air Corps, Dayton, Ohio, are still pending.

Bids have been asked on general contract by Cleveland Universal Jig Co., 2005 Rockwell Avenue, Cleveland, for one and two-story plant unit, to cost about $45,000 with equipment. Kalsch & Hoeffler, 4500 Euclid Avenue, are architects and engineers.

Patterson Foundry & Machine Co., East Liverpool, Ohio, is said to have plans for one-story addition to machine shop, to cost more than $50,000 with equipment.

Timken Roller Bearing Co., Canton, Ohio, has awarded general contract to Melbourne Construction Co., 225 Tuscarawas Street, West, for one-story addition 220 x 440 ft., to cost $225,000 with equipment.

Board of Education, Euclid Village, Ohio, is said to be planning installation of manual training equipment in three-story addition to high school, to cost $300,000, for which bids are being asked on general contract until July 15. Fulton & Taylor, 8120 Euclid Avenue, Cleveland, are architects.

Firestone Tire & Rubber Co., Akron, Ohio, has awarded general contract to Carmichael Construction Co., Central Savings & Trust Building, for two-story addition, to cost about $150,000 with equipment. Company is said to be planning other units later. Work has begun on two additions to branch mill at South Gate, near Los Angeles, to cost about $200,000 with machinery.

Patterson Steel Products Co., East Liverpool, Ohio, newly organized, has awarded contracts for a new building to cost $150,000, on a two-acre site. Company will manufacture forged and welded steel products, and part of its output will be taken by Patterson Foundry & Machine Co., jointly owned. D. G. Rhue, formerly of Morgan Engineering Co., Alliance, is general manager of new company.

Barnett Iron & Metal Co., Barberton, Ohio, has changed its name to I. A. Barnett Co.

Cincinnati

CINCINNATI, July 8.—The usual midsummer let-up in business has affected the machine tool market in this district and the brisk demand of a week ago has simmered down into an ordinary run of orders. A large manufacturer of lathes, who up to a week ago had maintained production well above normal, has reduced his daily output. Although fresh bookings are mostly for one or two machines, orders on hand are of sufficient volume to keep plants in operation throughout the summer.

Board of Works, City Hall, Columbus, Ohio, has awarded general contract to George H. Moor, Columbus, for hangar at municipal airport, with shop facilities, to cost $100,000 with equipment. Allied Architects Association, A. I. U. Building, is architect; W. H. Duffy is service director.

Union Solvents Corporation, Cincinnati, has been organized by Bernard E. Pollak, formerly an official of Pollak Steel Co., Temple Bar Building, and associates, to manufacture industrial alcohol, acetone and kindred products. Plant of Roseville Commercial Alcohol Corporation, Carthage, Ohio, has been purchased where initial production will be carried out.

Board of Education, Lebanon, Ohio, is considering installation of manual training equipment in two-story high and grade school, to cost $250,000, for which bids are being asked on general contract until July 24. Samuel Hannaford & Sons, Dixie Terminal Building, Cincinnati, are architects.

Commissioner of Public Utilities, Grounds and Buildings, City Hall, Chattanooga, Tenn., has plans for a hangar, 100 x 120 ft., with shop facilities and other units at municipal airport, Lovell field, to cost more than $50,000. Benjamin King & Associates, Hotel Patten, Chattanooga, and 1637 Massachusetts Avenue, N. W., Washington, are airport engineers in charge.

Stuebing-Cowan Co., 312 East Court Street, Cincinnati, manufacturer of electric lift trucks, tractors, platforms, etc., has work under way on first unit of new plant, one story, 160 x 300 ft., on 4-acre tract, with two-story office building, to cost about $200,000 with equipment. Other units are planned.

Girdler Corporation, Goss Avenue and Shelby Street, Louisville, recently organized by Walter H. Girdler and associates, will take over and consolidate Kentucky Oxygen Co., Vogt Instant Freeze Corporation, Vogt Processes, Inc., Cherry-Burrell-Vogt Co., and Helium Co., all with plants in this vicinity. Consolidated corporation will have assets of about $5,000,000, and will specialize in production of ice cream freezers, freezing machinery, helium gas specialties, commercial oxygen, etc. Expansion is planned. Mr. Girdler will be president of new company.

Marr & Holman, Stahlman Building, Nashville, Tenn., architects, have plans for six-story automobile service, repair and garage building, 100 x 175 ft., to cost over $200,000 with equipment.

W. H. Davis Die Co., 229 East Sixth Street, Cincinnati, has been incorporated to make cutting dies on contract. Harry A. Wiechman is vice-president.

Milwaukee

MILWAUKEE, July 8.—Production of machine tools continues at the high rate of recent months, with most shops unable to make any appreciable gains in delivery. New business is in good volume, although probably not so heavy as earlier in the year. However, nearly every line of metal working is represented, and while individual orders are small, the aggregate is large for this season of the year. The local pay-roll at the beginning of July was 253 less than on June 1, but nearly 7000 above a year ago.

Lakeside Bridge & Steel Co., Thirty-third Street and Lincoln Avenue, Milwaukee, is starting work on three shop extensions, 92 x 174 ft., 60 x 134 ft., and 40 x 67 ft., all 41 ft. high, costing about $40,000 without equipment. Charles G. Margwarth is vice-president and general manager.

S. Heller Elevator Co., 250 Milwaukee Street, Milwaukee, manufacturer of freight and passenger elevators, etc., has plans by W. Fred Dolke, Jr., consulting engineer, 9 S. Clinton Street, Chicago, for a third story addition and general alterations and improvements in plant and adjoining buildings recently acquired. About $50,000 will be spent for buildings and equipment. Leo K. Glueckstein is president.

Chicago & North Western Railway, 99 East Wisconsin Avenue, Milwaukee, is about to begin work on a $300,000 freight station and warehouse at Milwaukee.

Magnetic Mfg. Co., Milwaukee, is planning an addition to cost $30,000 with equipment. Machine tools will be purchased.

Karl Mfg. Co., Milwaukee, is being organized with $150,000 capital stock to manufacture metal appliances and devices for gas industry designed by Ray E. Gest, 899 Fifth Street, local. Company expects to start production about Oct. 1.

Northern Conveyor & Mfg. Co., Janesville, Wis., has broken ground for an extension, 40 x 157 ft. About $50,000 will be invested.

Milwaukee Specialty Co., 2017 Clybourn Street, Milwaukee, manufacturer of gas stove lighters and other appliances, will place contracts about July 15 for one-story shop extension, 35 x 73 ft., designed by Julius Leiser, architect, 105 Wells Street.

Acme Metal & Scrap Iron Co., 497 Virginia Street, Milwaukee, has plans by H. L. Kuehnel, consulting engineer, 4625 Woodlawn Court, for a one-story shop and warehouse addition, 45 x 110 ft.

Milwaukee Forge & Machine Co., Milwaukee, is having plans prepared for an addition.

Detroit

DETROIT, July 8.—Bids will soon be asked on general contract by Auto Specialties Mfg. Co., Edgewater Street, St. Joseph, Mich., for one-story addition, to cost over $350,000 with equipment. F. E. Davidson, 53 West Jackson Boulevard, Chicago, is architect and engineer.

Oakland Motor Car Co., Pontiac, Mich., has plans for a one-story addition to cost about $190,000 with equipment. Another one-story unit will also be constructed for storage and distribution, to cost $50,000.

Story & Clark Piano Co., Grand Haven, Mich., contemplates rebuilding part of local plant recently destroyed by fire. Company has lately become a unit of Walbert Mfg. Co., Chicago, manufacturer of radio equipment and parts.

Board of Education, 1354 Broadway, Detroit, will soon begin construction of one-story and basement addition to power plant on Linwood Avenue, to cost about $75,000 with equipment.

International Aircraft Co., Oncor, near Cincinnati, operating a local plant for parts production and assembling of airplanes, has plans for new plant at Reynolds field, municipal airport at Jackson, Mich., to cost more than $85,000 with equipment. Present works will be removed to new location and capacity increased. T. P. Funk chairman of board of Automotive Fan & Bearing Co., Jackson, is president of International company; D. G. Morrison, formerly general manager of Morrison Metal Stamping Co., is vice-president and general manager.

Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., manufacturer of heavy iron and steel castings, is concluding arrangements for purchase of plant and business of National Motor Castings Co., South Haven, Mich., manufacturer of pistons and other foundry products for automobiles, and will consolidate. Expansion will be carried out.

Department of Public Lighting, 138 East Atwater Street, Detroit, has plans for a one-story equipment storage and distributing plant to cost about $150,000 with equipment; repair facilities will be provided. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

Ainsworth Mfg. Corporation, Dubois and Franklin Streets, Detroit, manufacturer of automobile metal stampings, is concluding negotiations for acquisition of Joseph N. Smith & Co., 5914 Federal Avenue, manufacturer of automobile locks, hinges, etc., and will consolidate. Purchasing company is arranging for additional stock issue, part of proceeds to be used for expansion in production.

Detroit Aircraft Corporation, Detroit, has organized and purchased 90 per cent of capital stock of Blackburn Aircraft Corporation of Michigan, which will manufacture commercial airplanes and flying boats. Blackburn Airplane & Motor Co., Ltd., of England, has agreed to assign design and patent rights to latter on entire line of Blackburn metal aircraft for North and South America, with exception of Brazil.

Tyler-Chapman Engineering Co., 3555 Holcomb Avenue, Detroit, has been organized to succeed Tyler Engineering Service. Company will specialize in designing and building of machinery and fixtures, and will also produce several products on which it owns patent rights, such as a drill press, multiple spindle drilling heads, drilling machinery and full automatic single spindle drill units. Tracey Brooks Tyler is president.

Gulf States

BIRMINGHAM.—Plans are being completed by Texas Aero Corporation, Temple, Tex., for new aircraft plant at Love Field, Dallas, Tex., with initial unit for parts production and assembling to cost about $100,000 with equipment. Factory at Temple will be removed to new location. Roy Sanderford is general manager.

Central Foundry Co., Eighth Avenue, Bessemer, Ala., has plans for a one-story addition at cast iron pipe plant, to cost about $20,000.

War Department, Washington, has begun work on army airport and aviation school on property about 5 miles square, near San Antonio, Tex., for which Congress recently granted appropriation of $7,531,000, to be increased to $14,000,000, estimated cost of development. Hangars and shops will be constructed to provide for 250 airplanes at one time with other units for aircraft building, oil storage, etc. Site will be known as Randolph Field and will include complete housing development for about 5000 persons.

Board of Education, Humble, Tex., plans installation of manual training equipment in new two-story high school to cost $150,000, for which superstructure will begin at once. Harry D. Payne, Kirby Building, Houston, Tex., is architect.

Bryan Compress Co., Bryan, Tex., has purchased local property as site for new cotton compress plant, to cost about $40,000 with equipment.

J. M. Spain, Millsaps Building, Jackson, Miss., architect, has awarded general contract to W. G. Wetmore Construction Co., Jackson, for two-story automobile service, repair and garage building, to cost about $100,000 with equipment.

United Carbon Co., Union Building, Charleston, W. Va., has approved construction of two new units at carbon black plant at Borger, Tex., to cost more than $90,000 with compressors and other equipment.

Southern Air Transport, Inc., Fort Worth National Bank Building, Fort Worth, Tex., subsidiary of Aviation Corporation of the Americas, Inc., 100 East Forty-second Street, New York, is planning aircraft school near San Antonio, Tex., initial units to consist of two hangars, each 100 x 200 ft.; machine and repair shop, 80 x 100 ft.; administration building and other structures, to cost over $175,000 with equipment. A. P. Barrett is president of Southern company.

Texas Citrus Fruit Growers' Exchange, Mission, Tex., plans installation of conveying machinery and other equipment in one-story packing plant, 100 x 125 ft., at La Feira, Tex., to cost $75,000. H. P. Smith, National Bank of Commerce Building, San Antonio, Tex., is architect.

New Orleans Public Service, Inc., Baronne and Union Streets, New Orleans, has revised plans for two-story equipment storage and distributing plant, 75 x 150 ft., with repair facilities, to cost over $85,000. Clark Steen, Balter Building, is architect.

Greenwood International Co. Greenwood, Miss., local representative for International Harvester Co., Chicago, has awarded general contract to Ferguson Construction Co., Dermon Building, Memphis, Tenn., for one-story storage and distributing plant, 100 x 150 ft., to cost about $65,000 with equipment.

Indiana

INDIANAPOLIS, July 8.—Contract has been let by Union Drawn Steel Co., 2700 East Fifth Avenue, Gary, to General Construction Co., 479 Broadway, for one-story addition, to cost more than $45,000 with equipment.

Warner Gear Co., Muncie, manufacturer of automobile gears and assemblies, has awarded general contract to Albert J. Glaser, 610 Jefferson Street, for one-story addition, 150 x 400 ft., to cost about $100,000 with equipment.

Excelsior Wire Works, Inc., 319 West Maryland Street, Indianapolis, manufacturer of wire goods, bird cages, etc., has leased space in building at Nineteenth Street and Martindale Avenue, totaling 15,000 sq. ft. floor space, for new plant, and will remove to new location.

Indian Refining Co., Lawrenceville, Ill., has plans for two-story oil storage and distributing plant at Fort Wayne, to cost about $60,000 with equipment.

City Council, Elkhart, is considering establishment of municipal airport, including hangar, repair shop and other operating units, to cost over $50,000 with equipment.

Board of Trustees, Indiana State Prison, Michigan City, has authorized installation of plant at institution to manufacture metal automobile license plates, road markers, etc., to cost about $65,000

Glascock Brothers Mfg Co, 1515 West Fifteenth Street, Muncie, manufacturer of bottle coolers, dispensers and kindred equipment, has asked bids on general contract for three one-story additions, 50 x 80 ft., 40 x 60 ft., and 20 x 60 ft., to cost about $45,000 with equipment.

In connection with reference in these columns last week to new foundry to be established by W. A. Gingerick and associates, typographical error occurred in plant location, given as Arkon, which should be Akron, near Peru.

Bantam Ball Bearing Co. of Connecticut, Bantam, Conn., has decided to dissolve, sell its plant and concentrate manufacturing activities at plant of Bantam

Ball Bearing Co., South Bend. Latter company's shipments and orders for first six months of 1929 were double those of any similar period since 1922.

C. & G. Foundry Co., Indianapolis, has taken over United Brass Works to enlarge its facilities. Charles J. Geisler is president.

Pacific Coast

SAN FRANCISCO, July 3.—Contract has been let by Perfect Caster Co., Long Beach, Cal., to J. D. Sherer & Son, 1865 East Anaheim Street, for one-story plant, 70 x 100 ft., to cost about $40,000 with equipment. R. D. Van Alstine, Heartwell Building, Long Beach, is architect.

Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, has awarded general contract to Stone & Webster Engineering Corporation, Boston and Los Angeles, for new sheet glass plant at Santa Ana, Cal., with power house, machine shop and other departments, to cost $4,000,000 with machinery. Engineering department of company is in charge.

Board of Education San Diego, Cal., will build vocational training shops at new Herbert Hoover High School group at East San Diego, to cost $400,000, for which bids are being asked on general contract until July 29. T. C. Kistner & Co., Architects' Building, Los Angeles, and Spreckels Building, San Diego, are architects.

Chevrolet Motor Co., Detroit, has awarded general contract to F. J. Kirchoff Construction Co., 700 Lawrence Street, Denver., for factory branch, service and parts station at Salt Lake City, Utah, to cost about $180,000 with equipment.

City Council, Walla Walla, Wash., is planning establishment of municipal airport, including hangar, repair shop and other units, to cost $50,000. Bonds have been voted.

Bach Aircraft Co., Inc., Metropolitan Airport, Van Nuys, Cal., has awarded contract to George A. Chapman, Van Nuys for one-story unit, 100 x 100 ft., for parts production and assembling, to cost about $50,000 with equipment. It will replace part of plant recently destroyed by fire.

Board of Education, Los Angeles, plans manual training shop at new high school to be erected at South Gate, to cost $300,000, for which plans will be drawn by G. M. Lindsey and E. P. Eiden, Union Insurance Building, Los Angeles, associated achitects.

Municipal Light and Power Department, City Hall, Tacoma, Wash., is disposing of bond issue of $1,000,000 part of fund to be used for extensions and improvements in plans and system.

Meyer & Holler, Inc., Wright & Callender Building, Los Angeles, architects, have plans for a two-story automobile service, repair and garage building, 140 x 230 ft., to cost about $200,000 with equipment.

Canada

TORONTO, July 8.—Contracts will be awarded soon for additions and improvements to plant of Hull Iron & Steel undries, Ltd., Montcalm Street, Ottawa, Ont., to cost $200,000.

Folwell Engineering Co. has been awarded contract by Harbor Commissioners, Halifax, N. S., for addition to local grain elevator to cost between $3,000,000 and $4,000,000.

A two-story pumping station will be erected on Gouin Boulevard East for city of Montreal, to cost $107,000.

Additional airport construction is reported for city of Toronto. Canadian Airways will spend $100,000 on construction of an aerodrome; DeHaviland Aircraft Co. will spend $42,000 on an aerodrome and $100,000 on construction of a new plant; Canadian Colonial Airways have started work on an aerodrome to cost $100,000.

Ratepayers of Brantford, Ont., have authorized expenditure of $400,000 for a mechanical water filtration plant. Norman R. Wilson is waterworks engineer; W. S. & R. S. Lee, 1226 University Avenue, Montreal, are consulting engineers.

Anglo Canadian Wire Rope Co., Fairview Avenue, Lachine, Que., has started work on a one-story factory addition.

Consumers Gas Co., 19 Toronto Street, Toronto, has awarded general contract to Wells and Gray Ltd., Confederation Life Building, for a boiler and compressor building to cost $40,000.

Western Canada

West Kootenay Power & Light Co. has decided to proceed with power development on Pend Oreille River south of Nelson, B. C.

City of Cardstone, Alberta, is contemplating installing a new unit in electric light plant to cost $40,000.

Pool Construction Co. has been awarded contract for erection of a parts and service building at Regina, Sask., for General Motors of Canada, to cost $175,000.

Foreign

GOVERNMENT of Chile, Santiago, has authorized a fund of 40,000,000 Chilean pesos (about $4,800,000) for development of an iron and steel plant at Port Carral, where a State company is now operating a mill. Work will include new mills and other buildings, with installation of electric furnaces and other equipment, a large part of which, it is said, will be purchased in United States. Plant will be given over to production of rails, bars, plates, wire and kindred products.

Perryman Electric Co., 33 West Sixtieth Street, New York, manufacturer of radio tubes and equipment, is planning early establishment of new plant at London, England, to cost more than $100,000 with equipment.

Ruhr Chemical Corporation, Berlin, Germany, operating process nitrogen plants for production of fertilizers, has completed arrangements for sale of bonds in United States totaling $3,000,000, large part of proceeds to be used for expansion in plants. Considerable new equipment will be installed.

Ceskomoravska Engineering Co., Prague, Czechoslovakia, manufacturer of automobile parts, chassis, etc., has formed a subsidiary to operate in Poland. Property has been secured at Oswiccim, Cracow, for new plant to cost more than $250,000. Later division will be established for production of electrical equipment. New company will operate with capital of 2,000,000 zlotys.

General Motors China, Ltd., has been formed by officials of General Motors Corporation, Detroit, with capital of $200,000, to take over properties in China, heretofore conducted by another subsubsidiary, General Motors Japan, Ltd. Headquarters of new organization will be established at Shanghai, where expansion in assembling and service plants will be carried out later.

Gramophone Co., London, England, manufacturer of talking machines and parts, radio equipment, etc., will increase capital to £3,340,000, and will dispose of stock issue of 1,620,000 shares, considerable part of proceeds to be used for expansion in production and distribution. Company is controlled by Victor Talking Machine Co., Camden, N. J., and Radio Corporation of America, New York.

Plans are being considered by Spicer Mfg. Corporation, Toledo, Ohio, manufacturer of axles, universal joints and other automobile equipment, for a branch plant in France, to cost more than $250,000 with machinery. Charles A. Dana, president, has left for a trip abroad to secure site and complete details. Company is now operating a plant at Birmingham, England.

Swedish Ball Bearing Co. (Aktiebolaget Svenska Kullagerfabriken), Stockholm, Sweden, manufacturer of ball and roller bearings, etc., has arranged for a stock issue of 240,000 shares, of which 50,000 shares, totaling $3,433,000, will be sold in United States, proceeds to be used for expansion, including acquisition of other properties. Plants are operated in Sweden, Great Britain, France, Russia, Germany and United States, latter being known as S. K. F. Industries, with headquarters at 40 East Thirty-fourth Street, New York, and main plant at Hartford, Conn., operated under name of Skayef Ball Bearing Co. B. G. Prytz is managing director.

Petroleum Refineries, Ltd., London, England, recently formed with capital of £500,000 by Sir Arthur Grey Hazlerigg and associates, has plans for new plant at Killingholme, Lincolnshire, where property has been acquired, for production of refined oils. Division will be operated for manufacture of motor fuel oil under low temperature carbonization process. Entire project is reported to cost more than $600,000 with equipment.

New Trade Publications

Electric Welded Gas Line Pipe.—A. O. Smith Corporation, Milwaukee, Bulletin No. 505 gives impressive photographs of plant for making 26 miles of pipe daily, in any size from 8⅝ in. to 26 in., in uniform lengths of 30 or 40 ft. Tests for soundness and accuracy of size are described. A new feature is a corrugated expansion joint, also useful for short-radius bends.

Gears and Pinions.—Westinghouse Electric & Mfg. Co., East Pittsburgh. Booklet c-1579-F, describes Micarta gear material. Sections are devoted to design, application and distinctive features of gears. Data necessary to engineers for applying these gears to all classes of work are presented, with drawings and other illustrations.

Centrifugal Air Compressor.—Allen Air Appliance Co., 452 Lexington Avenue, New York. Bulletin A-50 of 12 pages illustrates and describes a line of centrifugal air compressors, with auxiliary equipment in the shape of vacuum cleaners for factory use, and other devices. These range from 50 to 150 hp. capacity in the stationary types and from 1½ to 10 hp. in the heavy-duty portable types.

Barometer and Vacuum Recorder.—Uehling Instrument Co., Paterson, N. J. Bulletin 150 of six pages illustrates and describes a combined barometer and vacuum recorder designed particularly for use in connection with steam turbines.

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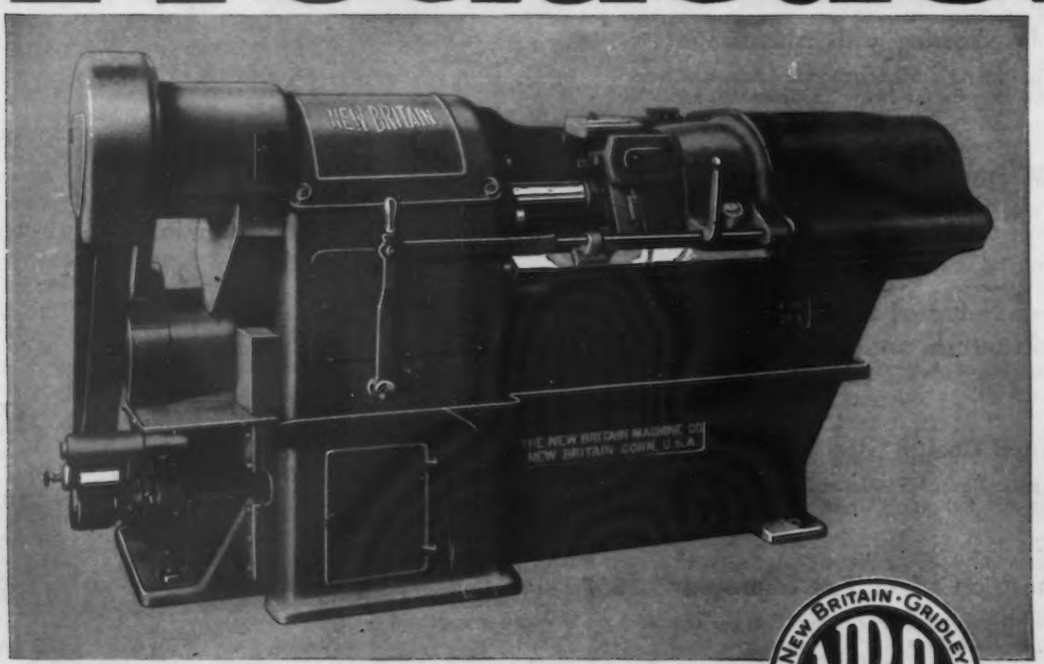

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